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EDITORIAL

International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE) is an open access international peer-reviewed, open-access journal, which provides a platform for highlighting and discussing various cognitive science issues dealing with the problems of cognition (and its evolution) within some specific subject field - philosophical, psychological, linguistic, mathematical, psychogenetic, pedagogical, ergonomic. Editorial Board strives to provide a possibility for the scientists of different fields to publish the results of their research, technical and theoretical studies. IJCRSEE is multidisciplinary in approach, and will publish a great range of papers: reports of qualitative case studies, quantitative experiments and surveys, mixed method studies, action researches, meta-analyses, discussions of conceptual and methodological issues, etc. IJCRSEE publisher is The Association for the Development of Science, Engineering and Education, Vranje, co-publisher is Don State Technical University, Russian Federation..

IJCRSEE particularly welcomes articles on the results of scientific research in various fields of cognitive science (psychology, artificial intelligence, linguistics, philosophy and neuroscience) catering for international and multidisciplinary audience. Readers include those in cognitive psychology, special education, education, adult education, educational psychology, school psychology, speech and language, and public policy. IJCRSEE has regular sections: Original Research, Review Articles, Studies and articles, Book Reviews, Case Studies, and is published three times a year. This journal provides an immediate open access to its contents, which makes research results available to the public based on the global exchange of knowledge. The journal also offers access to uncorrected and corrected proofs of articles before they are published.

The main aim of the Journal is to discuss global prospects and innovations concerning major issues of cognitive science, to publish new scientific results of cognitive science research, including the studies of cognitive processes, emotions, perception, memory, thinking, problem solving, planning, education and teaching, language and consciousness study, the results of studying man's cognitive development and the formation of basic cognitive skills in everyday life. The Journal seeks to stimulate the initiation of new research and ideas in cognitive science for the purpose of integration and interaction of international specialists in the development of cognitive science as interdisciplinary knowledge.

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Each submitted manuscript is evaluated on the following basis: the originality of its contribution to the field of scholarly publishing, the soundness of its theory and methodology, the coherence of its analysis, its availability to readers (grammar and style). Normal turn-around time for the evaluation of manuscripts is one to two months from the date of receipt.

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A manuscript goes through the peer review process. Authors submit manuscripts to Editorial office via the online system. The acknowledgement letter should be sent to the author to confirm the receipt of the manuscript. The Chief Editor first reviews manuscripts. Chief Editor is assisted by Section Editors (could also be Co- or Associated Editors). The Editor assigns a Section Editor to see the manuscript through the complete review process and return it with a recommendation or decision. The manuscript is checked to see if it meets the scope of the Journal and its formal requirements. If it is incorrect or unsuitable, the author should be informed and the manuscript filed (or returned if requested) – direct rejection. Manuscripts that are not suitable for publication in the Journal are rejected. A Rejection letter is sent to the author stating the reason for rejection. If the manuscript conforms to the aims and scope of the Journal, and formally abides by the Instructions to Authors it is sent out for review. Depending on the type of paper, it could be accepted immediately for publication (invited Editorial, Book review etc) by the Chief Editor.

Check that the manuscript has been written and styled in accordance with the Journal style; that it carries an abstract (if applicable), keywords, correct reference system etc. and check that the correct blinding system has been used. If anything is missing ask the author to complete it before the manuscript is sent out for review.

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Based on the reviewers' comments the Chief Editor makes a decision to:

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- Accept after revision
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An acceptance letter is sent to the author and the final manuscript is forwarded to production. Sometimes, the authors are requested to revise in accordance with reviewers' comments and submit the updated version or their manuscript to the Chief Editor. The time for review can be set to 2-6 weeks depending on the discipline and type of additional data, information or argument required. The authors are requested to make substantial revisions to their manuscripts and resubmit for a new evaluation. A rejection letter is sent to the author and the manuscript is archived. Reviewers might be informed about the decision.

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Layout Editor is responsible for structuring the original manuscript, including figures and tables, into an article, activating necessary links and preparing the manuscript in the various formats, in our case PDF and HTML format. When Layout Editor finishes his/her job they send manuscripts to Proof Editor.

Proof Editor confirms that the manuscript has gone through all the stages and can be published.

This issue has 19 articles (16 Original researches, 2 Review articles and 1 Case study). Our future plan is to increase the number of quality research papers from all fields of science, engineering and education. The editors seek to publish articles from a wide variety of academic disciplines and substantive fields; they are looking forward to substantial improvement of educational processes and outcomes.

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Visual Discrete Format: An Alternative to Likert-Type Formats of Survey Items Sensitive Enough to Measure Small Changes in Stable Constructs Such as Self-Concept in Science

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Abstract: A visual discrete format was developed for use in surveys as an alternative to a Likert-type format to measure changes in a relatively stable construct before and after an intervention. Visitors to a science centre ranging in age from 8 years old upwards were asked to complete surveys that included a seven-item questionnaire scale on self-concept in science using either the Likert-type format (n=446) or the visual discrete format (n=375), before and after their visit. A new set of statements to assess self-concept in science were developed and validated so they could be conducted on either format. Matched responses were used to calculate internal consistency, standard deviation, confidence interval and percentage of missing values; these were all similar for both formats. In the visual discrete format, text labels were replaced by visual labels with a single image of different size for each response option. While a Likert-type format describes a level of agreement/disagreement with a specific item, the visual discrete format relates more to choosing the best reflection of the self in relation to that item. The Likert-type format included a set of emoji in its descriptions to appeal to younger participants. The visual discrete questionnaire scale detected a small increase with medium effect size in self-concept in science after the visit to the science centre while the Likert-type questionnaire scale did not detect any change. This suggests the proposed new format can not only be a viable and useful alternative, but potentially more sensitive under certain conditions.

Keywords: *Likert-type scale, visual discrete scale, visual discrete format, self-concept in science, scientific literacy, questionnaire.*

Introduction

While learning is traditionally defined in terms of knowledge acquisition (Illeris, 2018), it also comprises changes in understanding, feelings, and attitudes (Illeris, 2018; Krishnamurthi and Rennie, 2012), self-related cognitions, interests, expectations, behaviours, and life-skills (Organisation for Economic Cooperation and Development, 2009). Perceived self-identity is a vital factor in whether and how a person engages with new information which can be obtained through many channels in life-long learning ecosystems (Longnecker, 2016).

To measure these constructs, it is often assumed that an honest respondent is enough for an accurate self-report (Paulhus and Vazire, 2007), and questionnaires are a popular method of data collection in informal settings (Diamond, Horn and Uttal, 2016; Fowler, 2013; Longnecker, Elliot and Gondwe, 2014; National Research Council, 2009).

However, questionnaires themselves are not only a method to elicit information, but a source of information that respondents use to determine their answer as well (Schwarz, 1999). Common method

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bias refers to the variance (both random and systematic) attributable to the measurement method, rather than to the construct. It is one of the main sources of measurement error (Podsakoff et al., 2003).

Likert-type formats are almost ubiquitous when surveying personal attitudes, including those about science. Despite how extensively used the Likert-type scales are as a measurement method, they can also be problematic (McLeod, Pippin and Wong, 2011).

This paper describes the development and testing of an alternative visual discrete format for items used in a questionnaire scale. To compare this new visual discrete format to the more familiar Likert-type format, we used both to survey young people's self-concept in science in a matched questionnaire before and after a visit to a science centre.

Self-concept in science is an important component of scientific literacy (Wilkins, 2004); it is relatively stable (Bong and Skaalvik, 2003; Lee, 1998) and may influence career aspirations in science (Nagengast et al., 2011). A more complete discussion on the choice of self-concept as the construct used in this comparison is presented in a later section.

Terminology

Terms related to rating scales are sometimes ambiguous or vaguely defined. For example, 'scale' is often linked to both an item and a questionnaire. Table 1 provides definitions of terms as used in this study.

Table 1
Terminology used in this study, as defined by the authors

Term	Definition
Item	Individual question or statement to elicit information about an attribute.
Item scale	Set of ordered response options that represent the level of agreement with an item.
Format	The way in which an item scale is arranged and displayed.
Anchor	Fixed reference point of a response option on an item scale.
Label	Verbal, numerical or visual tag to identify an anchor.
Questionnaire scale	Set of items that measure the same underlying construct with the same item scale and format.
Score	Sum of responses from all items in a questionnaire scale.
Mean score	Average of responses in a questionnaire scale.

Visual Discrete Format as an Alternative to Likert-type Formats

Likert-type Formats

The basic idea in many Likert-type formats is that respondents choose their agreement level with an item or statement from a pool of ordinal options, with response options often ranging from strongly disagree to strongly agree. The Likert-type format has symmetrical disagreement and agreement sides, which may or may not include a neutral mid-point.

Two main differences between Likert-type scales and visual discrete scales are presented below.

Visual Labels Versus Text Labels

One challenge in precision of measurements of attitude with the Likert-type format is that anchors are connected to text labels. Text labels are often recommended as "people respond to the ordinal position of categories as well as to the descriptors" (Fowler, 2013, p. 89). However, the lack of a natural and predefined order in words can make the scale anchors appear non-equidistant to respondents (Lantz, 2013). In other words, respondents may perceive that the interval between Strongly Disagree and Disagree is different from the interval between Disagree and Neither. This was revealed by Munshi (Munshi, 2014), who used a line to allow the user to create their own scale. His analysis showed responses can be clustered, as happens with items used in Likert-type scales. Although such formats can be seen as symmetrical around the neutral point, anchors are not perceived as equally distributed. For instance, the interval from the neutral point to simple agreement seemed to be 25% larger than from simple agreement to strong agreement.

Also, since anchors are connected to text labels, modifying the wording, such as using 'Somewhat Disagree' instead of 'Disagree', can change the way the item scale is perceived (Lantz, 2013).

The issue of lack of equidistance affects the validity of considering a Likert-type format as an interval format (Friedman and Amoo, 1999), which is crucial assumption to perform parametric statistics

(Field, 2013).

It has been proposed that the Likert 'fast form', with labels only at the ends, may alleviate the labels issue (Friborg, Martinussen and Rosenvinge, 2006; McLeod, Pippin and Wong, 2011). The logic of this approach is that end labels are connected to the fixed 0% and 100% of agreement. However, labels are also language and culture-dependent and may still bias the results, even when placed only at the ends. The more familiar the respondent is with an endpoint's wording, the more likely they'll choose that option (Weijters, Geuens and Baumgartner, 2013). For example, 'Completely agree' can be more familiar than 'Strongly agree' (Weijters, Geuens and Baumgartner, 2013).

Numbered ruler-type scales (Mellor and Moore, 2013), visual analog scales (van Laerhoven, van der Zaag-Loonen and Derkx, 2004), and numeric visual analog scales (van Laerhoven, van der Zaag-Loonen and Derkx, 2004) have been created as alternatives to reduce the equidistance issue in scales using Likert-type formats, but result in less engagement with children (Mellor and Moore, 2013; van Laerhoven, van der Zaag-Loonen and Derkx, 2004).

There has been little work done on visual alternatives to Likert-type formats, but Reynolds-Keefer et al. (2009) found no variability in responses of young children when comparing three pictorial Likert-type formats. One used words in capital and small letters (NO, no, yes, YES) and two used emoji sets (traditional smiley faces and sun-smiley faces) varying from angry to happy.

In this research, we created a visual alternative to the Likert-type format. Since familiar images require less cognitive effort to process than their equivalent text stimuli (Hirschman, 1986), the emphasis was transferred from text to visual labels. While a Likert-type format describes a level of agree-ment/disagreement, the visual discrete format is more about choosing the best reflection of the self in relation to a specific item.

Full Positivity Versus Symmetry

Given that positive integers are easier to understand than zero and negative numbers (De Cruz, 2006), it seems plausible to think that agree responses (analogous to positive integers) are also easier to understand than 'Neither' and disagree responses. Not including disagreement responses has been shown to be a more effective method for communicating judgments with young children (Hall, Hume and Tazzyman, 2016). "Usually, researchers will have more reliable, valid, and interpretable data if they avoid the agree-disagree question form" (Fowler, 2013, p. 91).

It is important to note that Likert (1932) developed his format to measure constructs such as attitudes about race relations. A wide range of opinions, from negative to positive attitudes may be expected in controversial constructs. Our format is not intended for use in measuring response to polarizing topics.

Self-concept in Science

Self-concept in science was the construct chosen for measurement and comparison of results using two different formats: visual discrete format and Likert-type format. Self-concept was chosen because it is an important aspect of confidence, is a stable construct, and changes, as influenced by visiting a science centre, have barely been studied.

Confidence is central in science; people are more likely to try something if they feel they can be successful at it (Fenichel and Schweingruber, 2010). Self-concept is an individual's general perception of their own abilities related to doing well in a given domain (Bong and Skaalvik, 2003; Jansen, Schroeders and Lütke, 2014; Wilkins, 2004). There can be a circular reinforcement between an individual's achievement and self-concept (Jansen, Scherer and Schroeders, 2015; Jansen, Schroeders and Lütke, 2014; Wilkins, 2004), even when the performance comes from a different area (Jansen, Scherer and Schroeders, 2015).

More specifically, self-concept in science refers to the perception of one's own ability to do well in science. This self-belief can influence attitudes and behaviour (Organisation for Economic Cooperation and Development, 2009; Wilkins, 2004) and is an important component of scientific literacy (Wilkins, 2004). "Most humans, most of the time, tend to act in accordance with the image that they have of themselves [emphasis in original]" (Miles et al., 1988, p. 25). Importantly, self-concept can also influence career aspirations in science (Nagengast et al., 2011; Venville et al., 2013).

Although self-concept is heavily influenced by social comparison (Bong and Skaalvik, 2003; Jansen, Schroeders and Lütke, 2014), it is a fairly stable construct (Bong and Skaalvik, 2003; Jansen, Scherer and Schroeders, 2015; Lee, 1998). Its importance and its stability make a self-concept construct ideal for comparing scales in a pre-test/post-test design. If changes were large, smaller differences might end up masked by larger changes measured in both scales.

There is little research on the effect of a setting of informal learning on self-concept in science. Most

of the relevant research is limited to other related constructs, such as attitudes towards science (Sasson, 2014; Şentürk and Özdemir, 2014), attitudes towards nature and biology topics (Sturm and Bogner, 2010), and self-efficacy in science (Martin et al., 2016; Sasson, 2014).

To our knowledge, only two articles report research about self-concept in science assessed before and after visiting a science centre. A seven-item questionnaire used to measure self-concept in science developed by Kind, Jones, and Barmby (2007) was completed by 932 students (aged 11-14) two weeks before a visit to Lab in a Lorry (a mobile laboratory), and by 668 of those students two weeks after. Not all students who completed the pre-questionnaire visited the laboratory. The mean score of self-concept in science decreased from $M=3.4$ to 3.2 . However, the researchers' goal was to test the scale, not to measure a pre-post difference, and the questionnaire was not pre-post matched. It is not reported why self-concept decreased, if the difference was significant, nor why some pupils didn't visit Lab in a Lorry.

The same instrument used by Kind, Jones, and Barmby (2007) for self-concept in science was included by Şentürk and Özdemir (2014) in their six-construct questionnaire to measure attitudes towards science in students 11-14 years old. The number of items used by Şentürk and Özdemir (2014) to measure self-concept in science is not reported, but the original source of the instrument, Kind, Jones, and Barmby (2007), reports seven.

The questionnaire by Şentürk and Özdemir (2014) was administered before, immediately after, and one week after visiting the Middle East Technical University's Science Centre (Turkey). The experimental group ($N=46$) was compared to a control group ($N=46$) that didn't visit the science centre and continued with regular activities at their school. Self-concept was reported as minimally changing in the control group. While scores after the visit ($M=29.07$) and one week after ($M=27.93$) are reported numerically, the value before the visit appears only plotted (along with the other two values). Graphical interpolation allowed us to calculate $M=25.2$ before the visit. Transforming scores into mean scores for ease of comparability (mean scores do not depend on the number of items, scores do), it is possible to see how the experimental group increased from a mean score of approximately 3.6 before the visit to 4.2 immediately after the visit, decreasing afterwards to a still significantly higher 4.0 one week later.

Materials and Methods

Instrument Development

Instruments for the Likert-type format and the visual discrete format were developed to compare responses before and after a visit to a science centre. Given that different wording of the same questions can produce different replies (Stockmayer and Bryant, 2012), and visitors included children and adults alike (more on this in the Data collection section below), it was decided to use the same survey for children and adults. The items are described further below. The images used in the labels (Figure 1b) were especially designed to appeal to younger visitors. The Likert-type format includes familiar text-based labels from 'Strongly Disagree' to 'Strongly Agree', but it is also accompanied by icons to simplify context and facilitate children's responses. The visual discrete format only includes one image repeated in each anchor, but with size scaled accordingly to the best reflection of the self it represents.

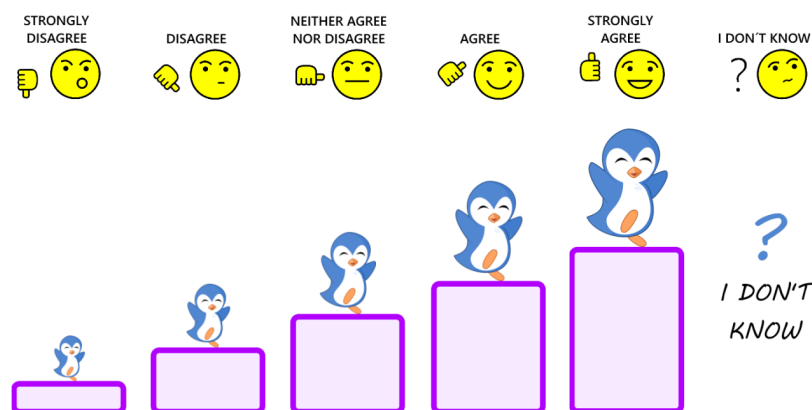


Figure 1. Labels of a) the Likert-type format (top), and b) the visual discrete format (bottom).

Notice that, while the Likert scale was originally designed to measure opinions in polarizing topics through choosing a level of agreement/disagreement, it has been adapted successfully numerous times

to fit a wide range of constructs. It is now common to find Likert-type scales not using the traditional agree/disagree format and measuring constructs from brand positioning to self-evaluations. The visual discrete scale was created to determine self-concept in science in visitors to museums, but it can be easily adapted to fit other settings and measurements. While the image size represents the respondent's visualization of himself/herself regarding science, it is so because the construct measured is self-concept in science. In a broader perspective, the image size relates to a level of agreement.

Visual Labels in the Likert-type Scale

Children process information more slowly than adults and need clearer instructions ([National Research Council, 2009](#)). Pictorially augmenting Likert-type scales with smiley faces ([Hall, Hume and Tazzyman, 2016](#)) is popular among teachers ([Reynolds-Keefer et al., 2009](#)), as this helps children interpret the scale ([Hall, Hume and Tazzyman, 2016](#); [Reynolds-Keefer et al., 2009](#)). [Stange et al. \(2018\)](#) used eye-tracking to discover that respondents to questions with smiley faces spent less time processing the questions and response options than those answering the version with text-only responses. They also found evidence of respondents with lower literacy relying more on smiley faces than those with higher literacy.

Emoji were used in the Likert-type scale to help younger respondents. However, the selection of smiley faces cannot be arbitrary. While typical sets of emoji range from sad/angry to happy/fun faces, these emoji cannot be applied to all constructs. Sad and angry faces were created to convey sadness and anger, not disagreement. Children hoping to have an enjoyable experience may tend to select only positive ratings ([Hall, Hume and Tazzyman, 2016](#)), i.e., the rejection of choosing 'disagreement' may actually be the rejection of sadness or anger. To avoid the sad/anger bias, we designed a new set of emoji to better express disagreement (Figure 1a).

Labels in the Visual Discrete Format

By removing text from labels, text-based bias might be eliminated from the measurement, but image features may influence the sentiment as well ([Siersdorfer et al., 2010](#)). Several characteristics of the visuals were considered, including visual attraction, as 'cuteness' can be especially important in modern digital culture ([Wittkower, 2012](#)).

Unlike other scales where accompanying icons are different for each response option, the visual discrete format uses only one image on all of the visual labels, minimizing the possible bias of one image being more enticing than other. The image was chosen to be a penguin standing on a step. To make the difference among them clear, the size of the penguin and the height (but not the width) of the step, vary proportionally to the level of agreement.

As there is no response that represents a zero or negative value, all of the options in the visual discrete format are positive, minimizing the possible negative versus positive agreement bias. A midpoint is still available (level three), but it's no longer a 'Neither'. For the 'I Don't Know' response, the penguin on a step is replaced by a question mark with the 'I Don't Know' text; it is placed at the far-right end.

A New Questionnaire Scale to Measure Self-concept in Science

The Trends in International Mathematics and Science Study (TIMSS) includes a number of questionnaire scales on science and mathematics ([International Association for the Evaluation of Educational Achievement, 2018](#)). One of those, a six-item questionnaire scale, measures self-concept in science. However, as a questionnaire scale, it was not suitable for our purposes; for example, the item 'Science is harder for me than for many of my classmates' is focused on formal education. There are few questionnaire scales on self-concept in science available, and self-concept is a construct that may be mis-interpreted. Take for instance [Kind, Jones and Barmby, \(2007\)](#), who include 'I get good marks in Science' as one of the items to measure self-concept in science, when that item is not related to a self-belief, but to facts printed on a report card.

It was decided to develop a full questionnaire scale designed for informal learning. It was designed to be as clear as possible to younger respondents, and items were carefully considered so that each one had an equivalent between the Likert-type scale and the visual discrete scale (Table 2).

Table 2

Items to assess self-concept in science are paired between the Likert-type format (left) and the visual discrete format (right).

Likert-type scale (LS)	Visual discrete scale (VDS)
"Select the one option for each statement that best shows what you think"	"Click on the penguin that best represents yourself in..."
LS1 I have a good understanding of science.	VDS1 ...science understanding.
LS2 I could explain some science examples to my friends.	VDS2 ...confidence to explain some science examples to your friends.
LS3 I learn science fast.	VDS3 ...learning science fast.
LS4 I am good at solving math problems.	VDS4 ...ability to solve math problems.
LS5 I am good at solving science problems that do not need math.	VDS5 ...ability to solve science problems that do not need math.
LS6 I can understand new science ideas.	VDS6 ...confidence to understand new science ideas.
LS7 I usually do well in science.	VDS7 ...doing well in science.

LS7 is a focal point of the TIMSS scale, as it was used in its earlier studies to measure self-concept in science with a single question (see [International Association for the Evaluation of Educational Achievement, 1998](#)). It is the only statement kept verbatim (in the Likert-type item) from TIMSS in our scale.

Reliability, Validity and Trustworthiness

In order to produce robust results and to strengthen confidence, an instrument must be reliable, valid, and trustworthy.

The visual discrete format was piloted in a previous survey (in the same science centre and target population). It consisted of a single item ('Click on the bunny that best represents yourself in science understanding') with an image of a bunny rabbit. The images were accompanied by the legends: 'Brand new', 'Beginner', 'Capable', 'Skilled', and 'Expert', with no 'I Don't Know' option. The pilot (n=224, Mpre=2.88, Mpost=2.97) showed no concerning patterns or issues. The instrument was then further developed to seven items, each with five ordinal options plus a nominal sixth option ('I Don't Know') and text labels were removed. Items were randomized every time by the survey platform, SurveyGizmo®. The bunny was replaced with a penguin because rabbits may be considered negatively as they are an invasive pest in New Zealand. The instrument and methodology were validated by a panel of seven experts in science communication. Data collection began again and no issues were detected.

Data Collection

This research was approved by the Human Ethics Committee of the University of Otago (17/062) and by the Māori Research Advisor of the University of Otago, the Ngāi Tahu Research Consultation Committee (5697_19577). All data were collected by the first author. Participants were informed about the project and signed a written consent form to participate. When participants were children, a second consent form was signed by parents/guardians. All data collected were anonymized and were only categorized by sex/gender and age. These are well-accepted moderating variables. A sex/gender gap in self-concept in science has been reported before, making this variable an important one to study. Knowledge and mental maturity can influence self-concept in science. As both are age-dependent, especially in young people, age was also an important variable.

Sex/gender categories were three: male, female and other. Data of the latter were minimal, and no statistical tests were performed under this category. Age categories were four: Children (8 to 12 years old), Adolescents (13 to 18), Young Adults (19 to 40), and Mature Adults (41+). The category Children was defined based on Piaget's theory of cognitive development as those in the concrete operational stage. The category Adolescents is described as the age range where people transit from childhood to adulthood. The adult groups are based on generational cohorts. The category Young Adults comprises mainly Millennials, people who are technologically savvy and grew up with personal computers, the internet and social networking. The category Mature Adults contains mainly Baby Boomers and Generation Xers, most of whom can be tech-savvy, but are not digital natives.

For the visual assessment of age and sex/gender of general visitors, the first author trained himself

during a trial period. He assessed sex/gender and age category of participants and later compared these data with the reported demographics in the survey. Once the assessment was fairly coinciding with the reported demographics, the actual data collection started. Visually assessing sex/gender and age is quick and unobtrusive, but asking visitors to sign a consent form would be disruptive and inappropriate. The ethics committees mentioned above approved dismissing a consent form in this case. These data were needed because survey demographics are not the demographics of the whole population, and they are needed for comparative reasons.

Pre-test/Post-test Design

A pre-test/post-test design (Creswell, 2009; Friedman, 2008; Hernández, Fernández and Baptista, 2014) was used to assess changes in visitors' self-concept in science. The focus reported here compares the performance of a new self-reporting method (the visual discrete format) to a Likert-type format in the case of a stable construct. This study was part of a larger research project (Solis, 2020), and the effect of visiting a science centre in learning is discussed in Solis, Hutchinson and Longnecker (2021).

Study Context: the Science Centre

The Otago Museum is an institution where nature, science and culture meet. It is located in the city of Dunedin, New Zealand. The importance of this museum to its community is reflected in its 150 years of history and a visitorship of about 350,000 annually (Otago Museum, 2019). The original Otago Museum's science centre, Discovery World, closed in 2017 for a full renovation. A larger and redeveloped science centre, Tūhura, opened later in 2017. Tūhura received more than 66,000 visits in its first financial year (Otago Museum, 2019).

Sampling Method

iPad tablets were used to collect data from visitors 8 years and older before and after their visit to the science centre. Using iPads instead of pencil and paper has advantages, such as being technologically attractive to respondents, allowing for randomization of question order and presentation in a visually uncluttered manner. Instead of crossing or circling a response, tapping with the finger on the response is enough to select it.

All visitors 8 years and older were asked to complete the survey, provided that at least two iPads were available, and there were enough caretakers in the group to look after younger children. A small token (a glow-in-the-dark figure or a fridge magnet in the shape of a butterfly) was given to participants after completing the post-survey. Data with the Likert-type format were collected from May to August 2018, and data with the visual discrete format from July to September 2018.

Respondent demographic data were collected in both surveys. To compare these to the general visitor population demographics and determine if respondents were representative of visitors, demographics of all visitors (both respondents and non-respondents) were visually assessed (Table 3). One third of the general visitor population is under eight years old. Since this demographic is not surveyable, many of their adult guardians were not surveyed either. As a result, fewer 19 to 40 years old visitors were surveyed, and the Children and Adolescents demographics increased their presence. The respondent demographics are different from that of the general population, but far from being an issue, having group sizes more evenly distributed produce more precise estimates of each age stratum in a non-homogeneous population (Etikan and Bala, 2017). In other words, having similar group sizes allows for each group to have enough data for statistical analysis, while if they had resembled the general population distribution, the Young Adults group would have ended with a big sample size and the Adolescents group would have been too small for any analysis.

Table 3

Demographics (%) of all visitors (visually assessed, VA), Likert-type scale (LS) respondents and visual discrete scale (VDS) respondents. Gender is based on N=3301 for all visitors (VA), N=442 for Likert-type scale (LS) and N=372 for visual discrete scale (VDS). Gender in toddlers under two years old was not visually assessed. Age distribution is based on N=3493 for all visitors, N=441 for LS and N=369 for VDS. To compare the demographics of survey respondents with visitors visually assessed, the value in brackets in VA is the equivalent percentage if children <8 years old were not considered.

	Females	Males	<2	2-7	8-12	13-18	19-40	41+
VA	56	44	6	26	12 (18)	8 (12)	30 (44)	18 (26)
LS	59	40	-	-	24	18	34	25
VDS	59	41	-	-	26	21	32	21

In terms of the comparability between scales, what is more important is that both samples are similarly distributed, supporting the assumption that both were drawn from the same population (Table 3).

Since visitors typically didn't come individually, but in groups, response rate was calculated by dividing the number of groups that were asked by the number of groups that accepted. Acceptance rate was 76% for surveys containing the Likert-type scale and 80% for surveys with the visual discrete scale.

Data Analysis

Statistical analyses (such as paired t-tests) were conducted using SPSS™ v25. Descriptive statistics (such as means) were obtained from SPSS™ v25 and plotted in Microsoft Excel™ 365.

Five pre-processing steps were taken in order to work only with reliable data. The first four consisted in removing unreliable responses. For example, if three or more answers in a scale were missing, either in the pre- or post-survey, the whole pre/post response was deleted. As a result, 18 responses were eliminated from the Likert scale and 11 from the visual discrete scale. If two or fewer answers in each 7-item set (pre or post) were missing, values were imputed in the last step using Expectation Maximization with SPSS™ v25 (pre and post separately). Missing data were missing at random (MAR). The maximum difference between Cronbach's alpha before and after missing values imputation in any set was 0.001.

For ease of interpretation, after deleting invalid responses and imputing missing values, scores were converted to mean scores by dividing the scores by the number of items (seven).

Before calculating reliability through Cronbach's alpha, each of the questionnaire scales (pre and post separately) were tested for unidimensionality using factor analysis by principal components. The minimum variance explained by a single factor in any of the questionnaire scales was 63%. In validation of the use of factor analysis, the minimum Kaiser-Meyer Olkin was .911 and the highest p-value of the Bartlett's test was below .001. Unidimensionality can clearly be seen in the scree plot of Figure 2.

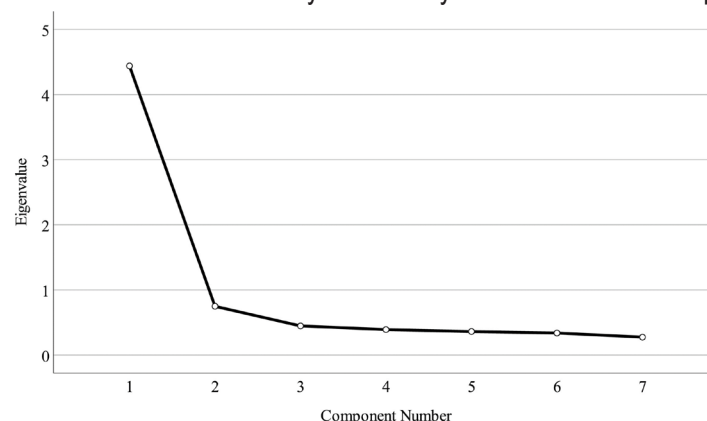


Figure 2. Scree plot of the questionnaire scale using the visual discrete scale (pre). The number of components with eigenvalue over 1 is the number of dimensions (underlying constructs) in the scale.

Results and Discussion

A Small but Significant Difference

Both Likert-type and visual discrete questionnaire scales had similar internal consistency, standard deviation, confidence interval and percentage of missing values (Table 4). An anticipated limitation of the visual discrete format was that it might be more difficult for respondents to understand. Since “missing values seem to occur because the scales are complex, not self-explanatory, and patients are unfamiliar with these tools” (Phan et al., 2012, p. 506), a greater number of missing values in responses to the questionnaire scale with the visual discrete format compared to the one with the Likert-type format would be evidence of perceived complexity. However, there was no difference between the scales in eliminated responses due to missing values.

Table 4

Comparison of pre-post parameters between the Likert scale (LS, N=446) and the visual discrete scale (VDS, N=375). M stands for mean, SD for Standard Deviation, CI for Confidence Interval at 95%, α for Cronbach's alpha, Elim for percentage of eliminated responses due to an excess of missing values, Skew for skewness, Kurt for kurtosis, d for Cohen's d, d_{CI} for confidence interval of d.

		M	SD	CI	α	Elim	Skew	Kurt	t-test	d
LS	Pre	3.69	0.81	0.08	.890	4%	-0.520	0.165	$t(445)=1.55$,	$d=0.073$,
	Post	3.73	0.81	0.08	.919		-0.566	0.298	$p=.123$	$d_{CI}=0.067$
VDS	Pre	3.46	0.84	0.08	.898	3%	-0.346	-0.129	$t(374)=8.33$,	$d=0.430$,
	Post	3.66	0.79	0.08	.913		-0.468	0.031	$p<.001$	$d_{CI}=0.074$

Self-concept in science, both before and after the visit, was not correlated with age (LS: N=441, $r_s=.016$, $p=.745$; VDS: N=380, $r_s=-.049$, $p=.346$) or after it (LS: N=441, $r_s=-.080$, $p=.094$; VDS: N=380, $r_s=-.013$, $p=.804$).

The Likert-type scale didn't pick up any changes comparing scores before and after visiting a science centre. This result differs from two studies where self-concept was reported to be significantly influenced by visiting a science centre, either to increase (Şentürk and Özdemir, 2014) or to decrease (Kind, Jones and Barmby, 2007). However, our findings are consistent with the more widely accepted characteristic of self-concept being a fairly stable construct (Bong and Skaalvik, 2003; Jansen, Scherer and Schroeders, 2015; Lee, 1998) where detecting changes would be particularly challenging.

The new visual discrete scale was able to statistically detect a small increase in visitor's self-concept in science after a visit to the science centre, with a medium effect size (Figure 3). The difference in the results of the two instruments is discussed in sections below.

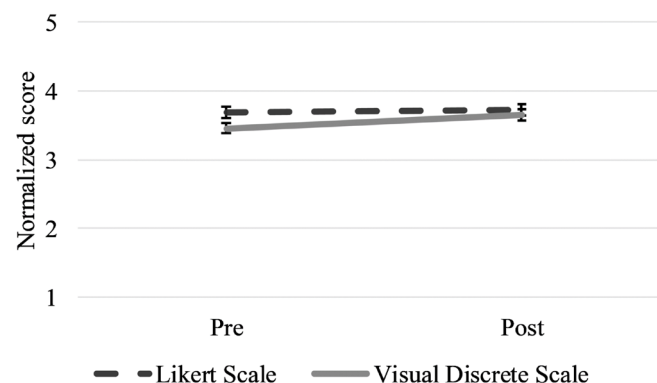


Figure 3. Means of self-concept in science before (Pre) and after (Post) the visit (N_{Likert scale}=446, N_{visual discrete scale}=375).

One-size-fits-all Behaviour

Figure 4 shows how mean scores of self-concept in science changed from before a visit to the science centre to after the visit. The difference is presented as percentage, centred around the mean

score with value 4 (mean score 4, MS4).

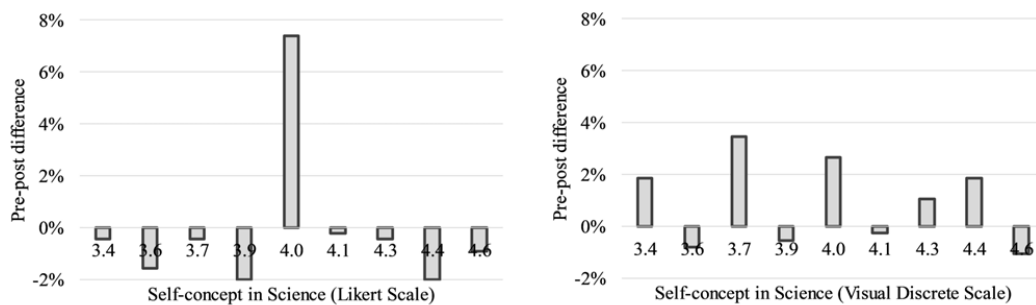


Figure 4. Pre-post changes around M=4.0 in self-concept in science. Percentage changes in the mean scores of self-concept in science from before (pre) to after (post) a visit to the Tūhura science centre around mean score 4: a) Likert-type scale (left), N=446, b) visual discrete scale (right), N=375.

Among these mean scores, there are cases where all responses in the questionnaire scale were 4 (i.e., all responses were 'Agree', termed 'monotone responses' here). These monotone responses with repeated value of 4 (monotone response 4, MR4) deserve closer attention, as they are related to a phenomenon that cannot be seen from summarized results.

When self-concept was measured with the Likert-type scale, MS4 represented 9% of the mean scores before the visit, from which 5% were MR4. Post-visit responses increased to 16% MS4 and 13% MR4. In other words, non-monotone responses 4 behaved as expected, staying stable (from 4% to 3%), but MR4 more than doubled, from 5% to 13%, representing most of MS4 after the visit. We call this a 'one-size-fits-all behaviour' and propose explanations below.

The one-size-fits-all behaviour is clearly smaller in the visual discrete scale. MS4 increased from 7% before to 10% after the visit, and MR4 went from 4% to 8%.

Sponge Effect

The peak in the mean score 3.7 of the visual discrete scale (Figure 4b) cannot be obtained from monotone responses, indicating that an increase in this mean score may be due to something different. Figure 4a shows that, as the monotone responses 4 in the Likert-type scale increased, other mean scores around it decreased. We call this a 'sponge effect' because the increase of 3.7 corresponds with decreases in neighbouring mean scores.

Possible Explanations of the One-size-fits-all Behaviour and Sponge Effect

We did not find any mention in the literature about the changed behaviour of answering with a range of options before an intervention, and then answering with a single option for each item in the whole questionnaire scale after an intervention (one-size-fits-all behaviour). The closest cases are a brief mention on choosing a particular column in multiple-choice tests of academic mastery as a peculiar bias (Osborne and Blanchard, 2011), and a discussion on a ceiling effect caused by children rating their mood as highly positive before an intervention when they expect it to be enjoyable (Hall, Hume and Tazzyman, 2016).

Several factors may contribute to the phenomenon. According to the 'classical test theory', every measurement (observed score) for a person is a composite of a true score and an error score. Measurements can differ under different conditions and the scores cannot be observed independently (Brennan and Lee, 2018).

In addition, a respondent who experiences overwhelming stimuli may issue a quick, self-reported response to get on with the task (Paulhus and Vazire, 2007). This may have happened in the case of our participants' visit to the stimulating environment of an interactive science centre.

It is also important to consider that respondent's confidence is based on the ease with which potential answers come to mind (Kelley and Lindsay, 1993). The 'testing effect' postulates that respondents to multiple-choice questions generally improve performance on a later test due to memory (Kromann et al., 2010).

Some respondents may have realized that the questions in the scale were closely related. When filling out the post-survey, they could have remembered that and, to avoid more mental exertion after the visit, they answered them with the one answer that best represented their overall thinking. For instance, 3,4,4,4,4,3,4 and 4,4,4,4,5,4,4 before the visit would both become 4,4,4,4,4,4,4 after the visit. If so, they

were not trying to avoid giving thoughtful answers, only to minimize the cognitive workload. This behaviour is likely to be unconscious. This reasoning would explain not only the one-size-fits-all behaviour, but also the sponge effect. To sustain this hypothesis, open questions of respondents with one-size-fits-all behaviour were examined individually; no skipping behaviour was found, supporting the premise of thoughtful respondents.

One clue as to why these phenomena happened in the Likert-type scale, but not in the visual discrete scale, is that using the same format for all constructs in a questionnaire can produce method bias (Podsakoff et al., 2003) because repetitiveness of items on a questionnaire may decrease a respondent's motivation (MacKenzie and Podsakoff, 2012). If people have become habituated to Likert-type scales, it may be that they find the format familiar enough to be confident that all the questions can be answered with a single option. Since the visual discrete format is new, visitors may have felt more inclined to read all the items again due to unfamiliarity.

Lastly, cute products can make consumers more indulgent in consumption choices (Nenkov and Scott, 2014). In this case, visitors didn't spend money, but the cuteness of the penguin in the visual discrete format could have made them more indulgent in spending their time, which could translate into reading the items carefully before and after the visit.

The one-size-fits-all behaviour and the sponge effect phenomena may have not been reported before in the literature because, in order to detect them, the construct being measured needs to be extremely stable, as the phenomenon's effect is very small. When measuring other constructs, the effect could have easily passed unnoticed.

Description of the Level of Agreement

A fast way to inspect results from five-point Likert-type responses is to report the combined percentage of respondents who 'Agree' or 'Strongly agree' with the item. A similar interpretation can be obtained with the visual discrete format by considering steps four and five as equivalent to agreement and strong agreement.

Comparability Between the Likert-type Format and the Visual Discrete Format

The Likert-type format was created to register approval and disapproval. Adaptations popularized alternatives for what to measure, such as the level of agreement and disagreement, but have kept the format symmetrical. While Likert-type formats have up to three choices of agreement (disagreement or negative side, agreement or positive side and, if present, neutral), the visual discrete scale is only positive. The absence of symmetry and text-based labels may help diminish the problem of anchors being perceived as unequally distributed (see Munshi, 2014; Worcester and Burns, 1975). Notwithstanding, the modification might lead someone to incorrectly think the new format is not comparable to the Likert-type format. An explanation of why they are analogous follows.

First, as both formats have the same use, they can be compared. If someone uses a nutcracker and a hammer to crack nuts, it doesn't matter how different they are, they can be compared in their capability to crack nuts. Likert-type scales have been widely used to measure attitudes about science in science centres (where attitudes of visitors are expected to be more positive than negative). We claim the visual discrete format is an alternative to it, without claiming equivalence of the visual discrete scale and Likert-type scales in polarizing topics.

Something to study further is whether these scales are comparable in a whole range of options or only on the positive side. The visual discrete scale could be more sensitive in capturing positive opinions due to having five levels of agreement versus the only two the Likert-type scale has ('Agree' and 'Strongly Agree'). However, respondents that require the negative side or the neutral point in the Likert-type scale wouldn't have an option to choose from in the visual discrete scale. Since respondents would not find the option they are looking for in this scenario, one red flag would be a clear increment in missing values (skipped items or selections of 'I Don't Know' responses). However, there was no increase in eliminated responses due to missing values (Table 4).

The other possibility would be an increase in selections of the far-left option (as it would be the closest option to neutral and negative). Figure 5 provides a visualization of what this other possibility would produce. The upper section of the figure shows the expected distribution of Likert-type responses considering most science centre visitors have an optimistic opinion about their self-concept in science (mean and median fall on the positive zone on the Likert-type format). If the negative zone and the neutral point did not have an equivalent in the visual discrete scale, and considering 'I Don't Know' is not selected more frequently, these responses would accumulate in the far-left option, which would be the closest one to their neutral/disagreement opinion. In other words, the Likert-type scale respondents who chose

'disagree' options would choose the smaller penguin/step (number 1) in the visual discrete scale. The expected distribution of this case is shown in the lower section of the figure. Visually, that would be seen as a peak on the left-most option and the positive zone would span from two options (A and SA) to five (1 to 5). An easy to detect outcome of the expansion would be a shift in mean and median to the left.

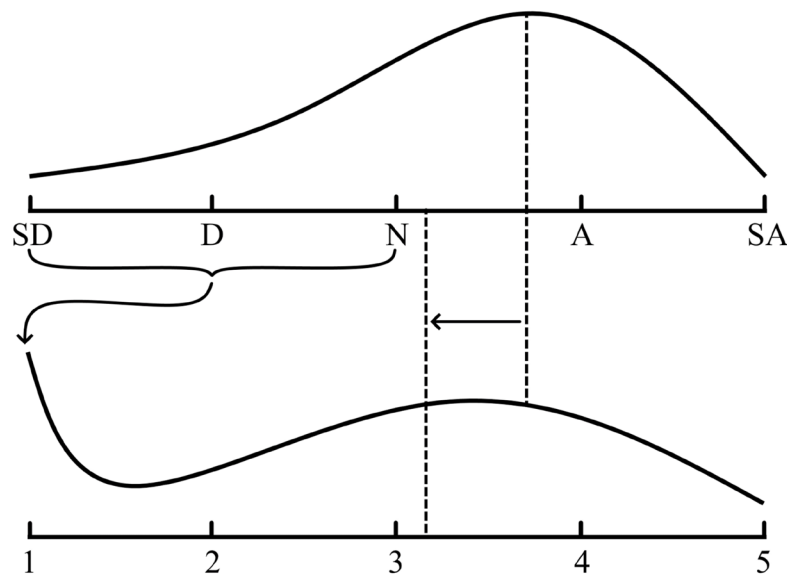


Figure 5. Simulation of what the visual discrete scale would look like if it were the expansion of the positive side of the Likert-type scale. The bracket signals the condensation of the negative and neutral options. The outcome would be a peak in the far-left VDS option and a shift of the mean (dashed lines).

Figure 6 shows actual scores from the post Likert-type questionnaire scale in this study and how these same scores would look like if they came from a visual discrete questionnaire scale behaving as explained above. It also includes the actual scores of the post visual discrete questionnaire scale. It is clear that the actual shape of the visual discrete questionnaire scale is a lot more like the Likert-type shape, and not like the hypothetical shape.

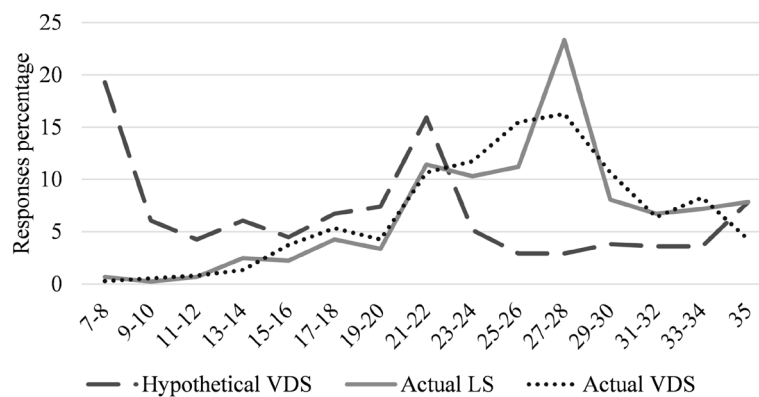


Figure 6. Comparison of actual score distributions of the post Likert-type scale (LS) and the post visual discrete scale (VDS) with hypothetical VDS if it were the expansion of the positive side of the Likert-type scale.

According to the above, both scales can be compared, and they produce similar results, supporting our claim that the visual discrete scale may be equivalent the Likert-type scale, and more sensitive, at least for stable constructs with a tendency for positive responses.

Limitations and Future Work

The first limitation of these findings is that the visual discrete format cannot be applied to all situations. It was designed as an alternative to Likert-type formats, but for when respondents assess themselves regarding a non-controversial construct. A Likert-type format may be expected to outperform the visual

discrete format when measuring polarizing topics, such as climate change, but further investigation is needed.

Another limitation to this and other studies is that pre-testing poses a risk of sensitizing and 'cuing' the user, affecting the outcomes (Friedman, 2008). However, there is no direct replacement, and matching pre and post responses is a widely-used experimental design that allows for changes to be detected in the same population (Creswell, 2009; Friedman, 2008; Hernández, Fernández and Baptista, 2014).

The one-size-fits-all behaviour and sponge effect deserve closer examination to determine what conditions produce them, how common they are and how strong their effect can be. The main characteristic of the visual discrete format may be its own limitation. Eliminating labels has the advantage of eliminating label-related issues, but the total absence of text labels can be cognitively more complex for respondents who are used to being given text-based instructions (Friborg, Martinussen and Rosenvinge, 2006). Children especially require clear instructions (National Research Council, 2009), tending to respond better to scales where each point is labelled (Borgers, Hox and Sikkel, 2003). Children from the age of 11 have significantly improved capacity to handle complex questionnaires (Scott, Bryninand Smith, 1995), but the visual discrete scale may have been more difficult for the younger children in this study; perhaps no issue was detected due to parental assistance. Further study with young respondents is advisable.

The Likert-type scale used in this study contained a new set of emoji that has not yet been independently tested. We posit that this set of emoji outperforms the sad/angry-to-happy/fun sets. Testing the performance of the new set was beyond the scope of the current research project. This needs to be tested more broadly. We hope that other researchers will find value in this format and test it in different contexts.

Conclusions

Going fully visual and positive in questionnaire instruments have not been widely studied. Making images vary in size proportionally to the level of agreement instead of changing the corresponding image is, to our best knowledge, new.

The visual discrete scale is sensitive enough to measure small changes in stable constructs, such as self-concept in science. It is expected that it will perform satisfactorily in measuring constructs related to the self that are influenced more rapidly, such as self-efficacy or scientific fluency. It is also expected that adaptations of the visual discrete scale can reliably measure opinions about science when the topic is not polarizing.

Since variation of scale properties is an effective remedy for controlling method bias (Podsakoff, MacKenzie and Podsakoff, 2012), the visual discrete format is a promising alternative to Likert-type formats. It is not necessarily a replacement, but potentially a suitable alternative.

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Conflict of interests

We declare that Professor Hutchinson has been a member of Otago Museum's Trust Board since 2008 and was Chairman of the Board during the research. Professor Longnecker joined the Otago Museum's Board in 2019, after this study was conducted. The Otago Museum granted freedom to collect data, but there is no conflict of interest as there was no financial support from the Otago Museum, nor influences on the outcome of the study.

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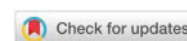
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A Study of Japanese University Students Influenced by the Covid-19 Pandemic and their Awareness with Their One's Own Face

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Abstract: In 2019, an outbreak of novel coronavirus infection (hereafter referred to as Covid-19) occurred, and on January 16, 2020, the first case of an infected person was confirmed in Japan. Now that more than two years have passed, the world is gradually returning to normal. However, the increased use of Social Networking Services (SNS) and web conferencing tools has caused young people, who are accustomed to seeing filtered faces, to become dissatisfied and uncomfortable with their own real faces. This has resulted in an increased number of young people who have become dissatisfied and mentally stressed with their facial features and expressions. Therefore, the author conducted a study on young people aged 18–20 years old in 2022 regarding this issue. The author evaluated the changes in awareness one's own face between the Covid-19 pandemic and the present among students attending Japanese universities, despite being affected by Covid-19 in the latter half of their high school or college years. The results indicated that 49.2% of the respondents revealed that their awareness their own faces had changed during the Covid-19 pandemic. Based on these findings, it is necessary for educators and parents to take considerable actions, so that young people do not become obsessed with the quality of their facial features and feel unduly stressed. Furthermore, young people should not be ashamed of their real, unfiltered faces.

Keywords: Covid-19 pandemic, changes in awareness of one's own face, students, face filtering, use of social media, education.

Introduction

On December 12, 2019, a new coronavirus (hereafter referred to as Covid-19) that causes acute respiratory syndrome humans began to spread in Wuhan, China (Zhou et al., 2020). According to Toriumi, Sakaki and Yoshida (2020), the social environment surrounding people in Japan changed significantly because of the effects of the Covid-19 pandemic, including requests to refrain from leaving the house, school closures, and other measures.

For example, one major change in behavior during the Covid-19 outbreak was in the manner of communication. Most meetings, discussions, and lectures that used to take place in-person before the Covid-19 pandemic were now conducted remotely using web conferencing tools. This resulted in an increase in the number of people who developed a negative perception of their own faces (Shauna et al., 2021). A study conducted in the U.S. found that mental anxiety increased as time spent on social media and web conferencing increased, especially among young adults aged 18–24 (Silence et al., 2021). Not only did communication methods and mental states change, lifestyle aspects, such as diet (Akaiwa et al., 2022), sleep (Okajima et al., 2021), and consumption behavior (Sun, 2021) changed as a result of the Covid-19 pandemic. It is also quite possible that the Covid-19 pandemic has brought to light the dissatisfaction that young people had with their own faces and body images. Even before the Covid-19 pandemic, facial attractiveness was regarded as a very important factor in social life (Baudouin and Tiberghien, 2004). And in fact, it has also been shown that physically attractive individuals benefit in a number of ways, including higher average wages and greater choice in dating partners (Olson and Marshuetz, 2005). These facts also predicted that young people would think that those with better facial and physical attractiveness would benefit, regardless of the Covid-19 pandemic, and that they would compare their face and body image with that of others. Sato (2021) showed that taking a facial selfie

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using a camera application with a face filter and manipulating one's own face had the effect of increasing the photographer's own self-esteem. This is thought to be mainly due to the ability to change one's own face in an attractive way, similar to makeup in females, and thus to an increase in self-esteem. In addition, the remarkable spread of image-posting SNS such as Instagram has led to an increase in the number of youths who are dissatisfied with their body image as well as their face, and some youths have been reported to have problems with their eating behavior (Hashimoto et al., 2018). The author assumes that the Covid-19 pandemic is further manifesting these problems related to the spread of SNS and youth dissatisfaction with their faces and body images.

Based on these societal changes, the author examined the awareness of young people living at universities in Japan toward their own faces in response to the Covid-19 pandemic. As mentioned above, the increased use of social media and web conferencing caused young people to question and feel uncomfortable about their own appearance (Swami, Horne and Furnham, 2021). Prior to the widespread use of web conferencing tools, the use of Instagram among college students has increased annually (Adachi and Muto, 2018); thus, it is clear that opportunities to view doctored human faces and videos have also increased.

Paying attention to one's appearance, including face and body shape, is not in itself a bad thing; however, young people who are faced with unexpected opportunities to use web conferencing tools as a result of the Covid-19 pandemic may become dissatisfied when they see their own faces, and this may increase the risk of becoming dependent upon cosmetic surgery and carrying a heavy mental burden. Because it is likely that the number of students who are psychologically stressed or dissatisfied with their facial features and expressions will continue to increase, it is necessary to examine and discuss the issue. Therefore, the author believes that it is essential to understand the current awareness of Japanese university students toward their appearance during the Covid-19 pandemic. The author conducted a survey targeting students entering their first year of college in April 2022. The students were asked about their awareness of their own faces and other changes in their lifestyles before and after the Covid-19 pandemic. The results provide insight into how the Covid-19 pandemic has affected the awareness of young people attending Japanese universities.

Materials and Methods

Student life usually consists of socializing with friends, participating in clubs and circles, and working part-time, in addition to taking classes and completing assignments (Mizokami, 2009). The majority of students entering college in the 2022 academic year were forced to change class formats and cancel events during their second and third years of high school because of Covid-19. Even after entering universities, students attend a mixture of online lectures using web conferencing tools (Tanaka, 2021) and in-person lectures. For some courses, there are few opportunities for students to participate in discussions with their peers. Even outside of the lectures, students were restricted in their on-campus activities, including wearing masks and refraining from talking with friends while eating or drinking.

Several studies (Rajkumar, 2020; Torales et al., 2020) on the impact of the Covid-19 pandemic on mental state and anxiety have been conducted in the past two years in countries around the world. For example, Hashimoto (2020) reported that the Covid-19 pandemic in Japan caused a great deal of anxiety and stress to many people. Many cited decreased income, anxiety about purchasing food and daily necessities, and anxiety about transporting their children to and from school while working. Although Hashimoto (2020) included some respondents in their teens and twenties, most of the respondents were between 30 and 60 years old, thus this was not a study specifically focused on college students or young people. Yomoda (2020) conducted a quantitative analysis of social media posts on the Twitter platform and a survey was conducted that reflected the awareness of the younger generation using SNS. However, these studies were based on surveys and analyses of the sentiments and awareness of subjects in the early stages of the 2020 Covid-19 pandemic. Thus, they did not account for the changes in behavioral restrictions and awareness since that time.

Cases have been documented in which people became dissatisfied with their appearance during the Covid-19 pandemic. A survey of 7,295 subjects in the United States conducted by (Silence et al., 2021) revealed that 70.6% of the subjects were anxious about resuming in-person activities. The reason given for the anxiety about resuming in-person contact was not related to contracting the virus, but rather "not wanting to be seen" with a deteriorating appearance including weight gain and increased face wrinkles. In addition, Silence et al. (2021) stated that one of the reasons for the anxiety associated with resuming in-person activities was the increased use of web conferencing tools, such as Zoom, because

it enabled the subjects to watch themselves speaking and responding to others in real time. As a result, they noticed wrinkles in their facial expressions and wrinkles on their faces that they would otherwise not have noticed by simply looking into a mirror. In addition, because one's face is displayed alongside the other participants in a web conference, it is possible to compare one's face with the others. As a result, one's awareness of their own appearance changed in ways that were not noticed before the Covid-19 pandemic. Some people became so anxious about interacting directly with others that they developed a lack of confidence in their appearance and underwent cosmetic surgery (Cristel, Demesh and Dayan, 2020). It is anticipated that anxiety associated with resuming in-person activities will vary depending on infection status; however, there are a certain number of people who are anxious about resuming in-person activities for reasons related to dissatisfaction with their face, in addition to anxiety about the virus, as has been shown in previous studies.

The problem that the author focuses on in this study is that young people have become used to seeing filtered faces and have begun to feel dissatisfied and uncomfortable with their own faces as a result of the increased use of SNS and web conferencing tools in the wake of the Covid-19 pandemic. After the spread of SNS and web conferencing tools, the number of young people who experience mental stress due to dissatisfaction with their own facial features and expressions has increased, and this may have a negative impact on the maturing process of young people, especially those in their late teens and early twenties, who are still maturing and acquiring a self-concept. Therefore, it would be significant to discuss the changes in young people's awareness of their own faces after the Covid-19 pandemic in this study in order to devise practical measures to support young people in the process of maturing in the future. The author believes that it is significant to conduct this study in order to find a solution to this problem because it may have a more serious impact on the psychology of maturing youth, even though there are few examples of this problem in previous studies. Most importantly, the conclusions of this study will be useful for the education of young people in the process of maturing. For this reason, the author hypothesized that some university students had a change in their awareness of their own faces after the Covid-19 pandemic and formulated the following two hypotheses to determine whether there were differences in the change in awareness of faces by gender.

h1: There is a difference in facial awareness between male and female during the Covid-19 pandemic.

This hypothesis was formulated since different genders have different habits, such as shaving and makeup, and there are differences in awareness of the face between the genders based on a series of results.

h2: There might be no difference in the "reason" for the change in their awareness of their faces between the genders.

This hypothesis was formulated that include the fact that the respondents were all living a similar life of self-restraint during the Covid-19 pandemic, that they became accustomed to having their faces manipulated through Instagram and YouTube while they were unable to go out during the period of self-restraint, and that more and more male are interested in cosmetic surgery and makeup nowadays.

In the following sections, the author describes the methods used to test this hypothesis.

The study population consisted of young people that were 18–20 years old as of May 2022. They were students attending Japanese universities in the latter half of their high school years or in the midst of their college years, although they were greatly affected by the Covid-19 pandemic. The social situation in 2022 is different from the chaos that occurred at the beginning of the pandemic and social activities, such as going out and having contact with people, have resumed. However, there have not been many studies on the awareness of young Japanese people living as students during this period, when it is unclear whether Covid-19 is under control. Therefore, in this study, the author used a questionnaire to survey young people living in Japan during their college years. The author evaluated the appearance issues surrounding young people during the Covid-19 pandemic. The following is an explanation of the methods used to achieve the purpose of this study. The survey was conducted in six steps.

[Step 1] Based on the above-mentioned rationale, there are two hypotheses (h1 and h2) to be formulated.

[Step 2] To obtain information to be used in testing the hypothesis, questions are prepared for use in a questionnaire survey of college university students.

[Step 3] The questions are posted on a web-based survey tool and distributed to students who will be entering university in 2022, requesting responses and obtaining information.

[Step 4] Simple tabulations and cross tabulations are conducted on the information obtained from the survey.

[Step 5] Tests are conducted from the results of cross-tabulations between genders for specific

questions to determine if hypotheses h1 and h2 are significant or not, respectively.

[Step 6] Based on the results of the tests, the author discusses whether the Covid-19 pandemic has affected the youth's own change in awareness of their faces, as well as educational measures to support youth who are overly conscious of their faces.

The gender and age of the respondents are shown in Figure 1(a). The largest age group was 18 year-olds for both males and females, which accounted for 166 out of 191 respondents, because the questionnaire was administered to university students who were enrolled in the 2022 academic year. As shown in Figure 1(b), 62.3% of the respondents were male and 37.7% of the respondents were female. The respondents were asked to indicate their gender as registered in their school registry at the time of enrollment.

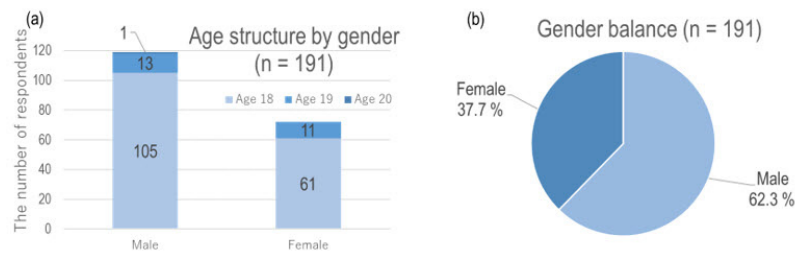


Figure 1. (a) Age structure by gender; (b) Gender balance.

The survey was conducted over a total of 5 days, from May 13 to May 18, 2022. There was no intention of inquiring about the subject's history of Covid-19 or their behavior during the period of infection spread. The respondents were informed that their answers would not be disclosed in a form that would enable their identification. Specifically, 191 university students attending school in Chiba Prefecture in Japan as of May 2022 were queried via a Google Form, a web-based survey tool, whether their awareness and behavior had changed during the Covid-19 pandemic and whether they were aware of a different lifestyle after the Covid-19 convergence. The questions were answered online and are listed in Table 1.

Table 1
Questions presented to the respondents

Question	
Q1	Please indicate your current age
Q2	Please select your gender (Please choose the gender that was registered at the time of admission to the university)
Q3	Which format for dinners, socializing, and entertainment do you prefer in the future?
Q4	Which format of lectures and meetings do you prefer in the future? (Excluding physical education and practical training courses that are difficult to sit in on)
Q5	Have there been any changes in your awareness of your own face after the outbreak of Covid-19?
Q5-1	Please select all the reasons that apply (Question asked only of those who answered "Yes" in Q5)
Q6	Has there been any change in your awareness of your own body shape since the outbreak of Covid-19?
Q6-1	Please select all the reasons that apply (Question asked only of those who answered "Yes" in Q6)
Q7	On May 11, 2022, the Cabinet Secretariat announced at a press conference that "it is not always necessary to wear a mask outdoors as long as you can keep a sufficient distance from people (The Nikkei Electronic Edition, 2022)." Please select the answer that is closest to your opinion about the future wearing of masks
Q7-1	Please select all the reasons that apply (Question asked only of those who indicated that they would like to continue to wear a mask year-round for the time being)
Q7-2	Please select all the reasons that apply (Reasons other than to prevent heat stroke in mid-summer, Question only for respondents who indicated that they would like to stop wearing masks regardless of TPO)
Q8	What do you think about increased opportunities for in-person activities in anticipation of Covid-19 convergence? Please choose the one that comes closest to your opinion
Q9	Please select all the new lifestyles you would like to see continue in our society after Covid-19 pandemic

The questions were developed based on "New Lifestyle Practices" (Chiba Prefecture, 2022) published by Chiba Prefecture as a reference material, as well as on the issues related to the perception of appearance as included in the previous studies described above. The previous studies demonstrated that the Covid-19 pandemic caused many people to look at their own and other people's faces more often than before, and many underwent cosmetic surgery as a result of the pandemic. In addition, some

previous studies (Suzuki and Yazawa, 2021) have shown a relationship between the wearing of masks and the awareness of one's own face. The questions were designed with an awareness of the issues raised by the previous studies. In particular, questions regarding the wearing of masks were designed so that the respondents could select their answers according to time, place, and the situation. In addition, questions were designed so that the respondents could select either financial, physical, or mental burden as the reason for not choosing to wear a mask. The author confirmed that there were no omissions or biases in the answers.

Q5-1 and Q6-1 asked those who answered "yes" to the question whether their awareness of their face and body image had changed. Only those who answered "yes" were asked the reason for the change. Q7-1 and Q2 Q7-2 asked those who chose either "want to continue wearing a mask all year round" or "want to stop wearing a mask immediately," but not all 191 respondents answered these questions. The author analyzed the results by simple tabulation and crosstabulation among the attributes and conducted a χ^2 test to analyze the differences in awareness of the face between genders during the Covid-19 pandemic.

Results

Results a In this study, the author asked young Japanese students to answer the questions listed in Table 1 to clarify how the awareness their own faces have changed since the Covid-19 pandemic. The study focused on changes in the awareness of college students toward their own faces during the Covid-19 pandemic. Thus, the author analyzed the answers to the questions in Table 1, especially those that were concerned with face awareness.

Figure 2 (a) shows the breakdown of the responses (n = 191) to the question of whether or not face awareness changed and (b) the gender ratio of the 94 respondents who answered "yes." Of the 94 respondents who reported a change in awareness of their face, 43.6% were male and 56.4% were female.

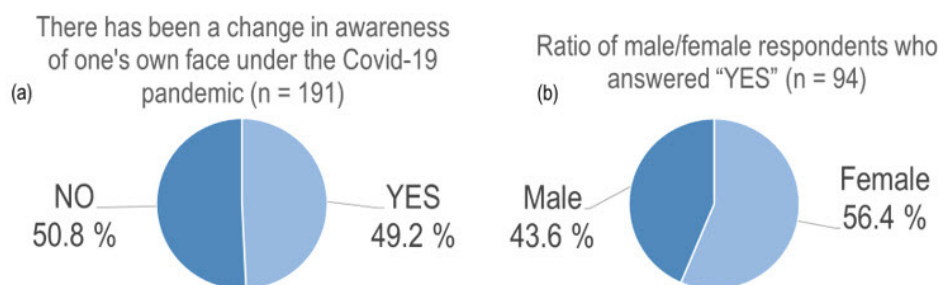


Figure 2. (a) Answers to questions asking about changes in awareness of one's face; (b) Ratio of male: female respondents who answered "YES."

The 94 respondents who indicated that their face awareness had changed were asked to give the reason for the change. The result is shown in Figure 3 in next page.

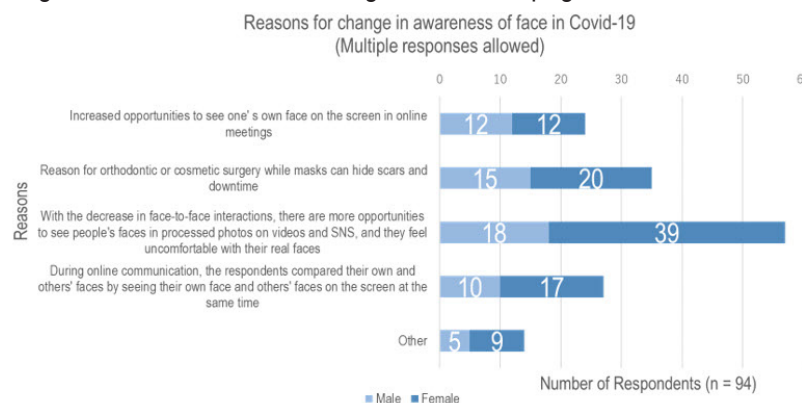


Figure 3. Reasons for the change in awareness of one's face during Covid-19 (Multiple responses allowed).

As shown in Figure 3, the main reason for the change in the respondents' awareness of their own faces was "Because I have fewer in-person interactions, I have more opportunities to see people's faces in processed photos on videos and SNS, and I feel uncomfortable with real faces without processing," which was selected by 60.6% of the respondents (57 out of 94, including 18 males and 39 females). The next most common response was "I feel uncomfortable with unprocessed photos" (60.6% of the 94 respondents, including 18 males and 39 females). The next most common response was "I wanted to have braces or cosmetic surgery while I could hide my scars and the progress of my surgery with a mask," which was derived from the fact that wearing a mask had become an everyday occurrence. This answer was supported by 37.2% of the respondents (35 out of 94, including 15 males and 20 females).

The question asking about changes in awareness faces corresponded to the question that does not ask about one's approval or disapproval of things, but rather the reasons for such changes. To take such cases into account, the questionnaire used a multiple-choice format that enabled the respondents to answer more than one question. In addition, a free response box was provided for "other" in case none of the options matched the respondent's opinion, or in case the respondent wanted to express his or her own opinion. Table 2 shows, in its original form, the answers that were considered valid for the question in which answers were included in the "Other" column.

Table 2

Free response content corresponding to "Other" (original text by the respondent)

Responses to "Other"
My awareness of makeup has changed
The more the mask hid my complex, the more I resisted taking it off
I want to clean my skin while my face is hidden by the mask and look good when I take it off
Cannot receive facial expressions in gestures, etc., unless face-to-face
Embarrassed to take because they are accustomed to being in a mask
I feel safe when I wear a mask and uncomfortable when I don't
I shave less often
I lost confidence in my face
I became concerned about the way people look at me and the way they look at me with respect to my face. I can no longer remove my mask in front of others
I no longer wear foundation and lipstick
The mask caused skin irritation
I am less concerned about my beard and other parts of my body that are hidden by the mask
I've got a bigger expression on my face
I noticed the change in my impression before and after removing the mask

In the "other" category, thoughts about makeup and cosmetic surgery were given as well as the habit of wearing a mask enabled them to hide their dissatisfaction with their face, or they became concerned about the way people looked at them and they could not take off their mask. In addition, they were concerned about the way people looked at them and their own faces and were unable to remove their masks. Other responses included no longer wearing makeup and no longer shaving, indicating that they had become less conscious of their appearance. The fact that they were no longer conscious of their faces was one of the changes. In addition, some students also changed their awareness of their faces, not in terms of facial features, beauty, or ugliness, but in terms of facial expressions, such as the need for gestures in communication. The facial expressions of others cannot be conveyed when wearing a mask, and there was a desire to make their own facial expressions more expressive.

As shown in Table 3, a crosstabulation of the results was conducted to test the hypothesis that "there is a difference in facial awareness between male and female during the Covid-19 pandemic." This hypothesis was formulated based on the fact that different genders have different habits, such as shaving and makeup, and there are differences in awareness the face between the genders based on a series of results.

Table 3
Results of crosstabulation between genders on changes in awareness one's own face during the Covid-19 pandemic

	There was a change in awareness of own face		
	n (%)	YES	NO
Gender	191 100.0	94 49.2	97 50.8
Female	72 100.0	53 73.6	19 26.4
Male	119 100.0	41 34.5	78 65.5

The results of the χ^2 test for the above data revealed that there was a significant difference (0.1% level, $p = 1.6E-7$, $\chi^2 = 27.5$) between "gender" and "whether or not there is a change in awareness of one's own face after the Covid-19 pandemic." In other words, the hypothesis that there was a difference in the presence or absence of a change in facial consciousness during the Covid-19 pandemic depending on gender was confirmed. More female students than male students showed a change in facial awareness with a difference of 39.1 points.

Table 3 shows that more female than male clearly had a change in their awareness of their own faces during the Covid-19 pandemic. However, this is only because more female respondents had changes in their awareness of their faces, indicating that there is a relationship between gender and changes in awareness. In fact, Table 3 shows that 34.5% (41 out of 94) of the male students responded that there was a change in their awareness of their faces, although this proportion was smaller than that of the female students. The author hypothesized that whether or not there was a change in awareness of faces was only a consequence of the results, and that there was no significant difference between males and females in terms of the reasons or triggers for the change in awareness. The reasons for this hypothesis include the fact that the respondents were all living a similar life of self-restraint during the Covid-19 pandemic, that they became accustomed to having their faces manipulated through Instagram and YouTube while they were unable to go out during the period of self-restraint, and that more and more male are interested in cosmetic surgery and makeup nowadays. In addition, more and more male consumers are interested in cosmetic surgery and cosmetics nowadays. The author conducted another cross tabulation and test for the hypothesis that there might be no difference in the "reason" for the change in their awareness of their faces between the genders. The results are shown in Table 4.

Table 4
Results of Cross-tabulation among Attributes for Reasons for Change in awareness of Face in Covid-19

Reasons for change in awareness of face in Covid-19 (multiple responses allowed)	Total	Gender	
	n (%)	Male (%)	Female (%)
Answer frame	94 100.0	41 43.6	53 56.4
Increased opportunities to see one's own face on the screen in online meetings	24 100.0	12 50.0	12 50.0
Reason for orthodontic or cosmetic surgery while masks can hide scars and downtime	35 100.0	15 42.9	20 57.1
With the decrease in face-to-face interactions, there are more opportunities to see people's faces in processed photos on videos and SNS, and they feel uncomfortable with their real faces	57 100.0	18 31.6	39 68.4
During online communication, the respondents compared their own and others' faces by seeing their own face and others' faces on the screen at the same time	27 100.0	10 37.0	17 63.0
Other	14 100.0	5 35.7	9 64.3

The results of the χ^2 test for the above did not reveal any significant difference in "reasons for change in awareness of one's face after the Covid-19 pandemic" according to "gender" (0.5 % level, $p = 0.33$, $\chi^2 = 4.60$). The most frequently cited reason for the change in facial awareness among males was that they had more opportunities to see their own faces due to the use of web conferencing tools, accounting for 50.0% (12 out of 24) of the respondents. The largest number of female respondents, 68.4% (39 out of 57), chose the reason that they had become accustomed to looking at processed photos of their faces, and that their awareness of their real faces had changed. The results of this survey indicate that many Japanese university students have experienced a change in their awareness of their own faces as a result of the Covid-19 pandemic, and that this change is more pronounced among females. However, there was no difference in the reasons for the change in consciousness between male and female, and the author can predict a change in male awareness of lifestyle, cosmetics, and cosmetic surgery. This point is discussed in the next section.

Discussions

Throughout the Covid-19 pandemic, nearly half (49.2%) of the students who participated in the survey recalled a change in their awareness of their own faces. As mentioned above, the author do not believe that wanting to be beautiful or being conscious of one's face and other aspects of one's appearance is in itself a bad thing. However, (Třebický et al., 2016; Rice, Graber and Kourosh, 2020) indicated that it is necessary to prevent the spread of problems, such as "Snapchat dysmorphia" or the excessive concern about one's face caused using apps with face-processing filter functions, especially among younger generations. This should be discouraged, especially among the younger generation. As shown in the aforementioned studies and the results of this survey (Figure 3 and Table 2), there were a certain number of people who had become accustomed to their own and others' faces being filtered through the increased use of Instagram and web conferencing tools during the Covid-19 pandemic, or who had become highly dissatisfied with their own faces and expressions when their faces were placed alongside others. There are a certain number of people who have become accustomed to their own and others' filtered faces and who have become highly dissatisfied with their own faces and expressions when their faces are placed alongside those of others. In other countries, the number of people who underwent aesthetic changes, such as cosmetic surgery, increased after the Covid-19 pandemic, because the habit of wearing masks made it easier to hide temporary scars and swelling after cosmetic surgery (The Aesthetic Society, 2020). As shown in Figure 3 and Table 2, some students considered cosmetic surgery while their faces were hidden by masks and some students were opposed to having their masks removed to reveal their true faces, suggesting that the same phenomenon may occur among Japanese university students as reported elsewhere. Therefore, it is possible that the same phenomenon as reported in other countries may also occur in Japanese university students.

As shown in Table 3, 49.2% of the respondents indicated that their awareness their faces changed after the Covid-19 pandemic. Among them, 42.9% of males (15 out of 35) considered cosmetic procedures, whereas masks could hide postoperative facial scars and swelling. The sense of beauty is also growing among males and cosmetic surgery is no longer limited to females (Kawano et al., 2021). Thus, appearance is becoming an important component of masculinity for males (Castro-V, 2012; Saladin, 2015) and issues related to aesthetics and appearance are highly relevant to both genders, despite differences in awareness. In particular, male may become increasingly concerned about facial wrinkles and expressions and compare their appearance with that of others, especially since many business people will be using web conferencing tools when they begin working, even if they are currently university students. As shown in Table 4 and the results of the χ^2 test, although fewer males than females reported a change in their awareness of the Covid-19 pandemic, the reasons for the change did not differ between males and females. The author consider that college-age youth have become particularly conscious of their appearance, regardless of gender, due to various changes caused by the Covid-19 pandemic. On the other hand, according to a survey conducted in 2020 on 579 adult female ranging from 20 to 60 (Yazawa and Suzuki, 2022), 46% of the subjects answered that they "no longer wear makeup on parts of their face (lipstick, lipstick, blush, cheek rouge, etc.) that are not visible when wearing a mask" because of the mask mandate. In fact, the number of subjects who stopped wearing makeup because of mask wearing was the highest among all respondents.

The respondents of this study was a group of young people between the ages of 18 and 20 that were attending a university. The author speculate that young people need to be told that the pictures of their faces posted on SNS are not always accurate and they should not be ashamed of their real faces.

They should understand that they rarely have the opportunity to interact with people at a distance from the camera in which they take selfies and many of the faces they see in short videos and photos are processed. Above all, educators and adults who have completed their schooling should tell young people that facial features alone do not determine the quality of a person in the society in which the author live. The author conclude that it is also important for adults that are around young people to affirm the good qualities of a person, which are not related to his or her face or appearance.

Conclusions

In this study, the author focused on 18–20 year-old students attending Japanese universities in the midst of their student life in 2022, who were greatly affected by the Covid-19 pandemic. The author assessed the changes in their awareness of their own faces before and after Covid-19 pandemic. As a result, 49.2% of the respondents indicated that their awareness of their own faces had changed as a result of the Covid-19 pandemic. Of the 94 respondents who reported a change in their face awareness, 43.6% were male. In addition, there was a significant difference in the change in awareness of one's own face after the Covid-19 pandemic among college students between the ages of 18 and 20, which was dependent on gender.

Nowadays, cosmetics and cosmetic surgery are becoming more common not only among females, but also among young males. Although it was good that both genders are becoming more aware of beauty, educators and adults should prevent young people from becoming highly dissatisfied with their real faces and accompanying undue stress. They should help them understand that many of the faces they see in short videos and photos are processed. In the post-Covid-19 era, the solution to the appearance problem lies in communicating to young people that the faces in doctored images are rather unnatural and that should not be ashamed of their real faces. Finally, since the number of respondents in this study was small (191), it will be necessary to conduct additional surveys targeting a larger number of young people in the future.

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This is to certify that this paper has been edited for English language, grammar, punctuation, and spelling by Enago, the editing brand of Crimson Interactive Pvt. Ltd under Advance Editing B2C.

Conflict of interests

The author declares no conflict of interest.

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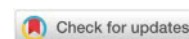
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The Cross-Cultural Differences in Perceived Stress of the COVID-19 Pandemic in Schoolchildren from Russia and Kyrgyzstan With Normal and High Levels of Anxiety and Depression

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Abstract: Children and youth of school age form a special population group highly sensitive to various stressors and negative effects in everyday life. The COVID-19 pandemic crisis characterized by uncertainty, vulnerability, changes in quality of life together with urgent transition to distant/online learning affected significantly psychological well-being of children and youth. The aim of this study was to assess the cross-cultural differences in actual stress in Russian and Kyrgyz schoolchildren with high and low levels of anxiety and depression during the initial stage of the COVID-19 pandemic and after a year life during the pandemic. The descriptive cross-sectional study was conducted via an online survey completed by total 1834 schoolchildren aged from 13 to 18 from Russia and Kyrgyzstan, the periods of survey: 10th May - 10th June, 2020; 18th May - 15th June, 2021. The Perceived Stress Scale and Hospital Anxiety and Depression Scale were used to assess stress, anxiety and depression scores. The findings suggest that there are cross-cultural differences in perceived stress amongst schoolchildren with high level of depression and anxiety: Russian respondents in 2021 demonstrated less pronounced index of the perceived stress than Kyrgyz schoolchildren. The stress level of Kyrgyz schoolchildren increased significantly in 2021 in comparison to the period of outbreak of the pandemic. In 2021 in both countries we found the same pattern: girls had significantly more pronounced stress than boys. The results disclose important aspects of the impact of COVID-19 on schoolchildren and demonstrate the emerging need of psychological aid and for supporting schoolchildren mental health.

Keywords: COVID-19 pandemic, psychological outcomes, stress, anxiety, depression, schoolchildren.

Introduction

The COVID-19 pandemic has proven to become a global stressful situation for the whole world. As a result, fundamental changes took place in people's daily lives - some people lost their jobs, some had to adapt to new, remote working conditions, home confinement, lockdowns, social distancing, constant fear of infection (Salari, et al., 2020). However, the psychological impact of the COVID-19 pandemic is much more serious than the somatic consequences of the infection (Espinola, et al., 2016). The COVID-19 pandemic led to psychological difficulties that occurred not only in those who were infected and recovered, but also in many people who were not directly affected.

From a psychological point of view, the majority of people feel uncertainty, unpredictability, confusion on the one hand, and at the same time the importance of what is happening, on the other hand. The emergence and development of pandemics usually affect the entire population of the planet

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and lead to impairment of the psychological well-being of people. Prolonged home confinement, lack of direct interpersonal communication, lack of physical and social activities, disappointment and boredom from the monotony of the quarantine lifestyle are among the aggravating factors in formatting of adverse psychological consequences. Therefore, among most typical psychological responses towards worldwide epidemics and pandemics are worries, anxiety, distress, depression, nonspecific and unguided fears (Taylor, 2019). During the COVID-19 pandemic social and physical distancing as well as quarantine were imposed by the government due to unknown course of the disease and high risk of mass spread of poorly understood infection, lack of proven treatment and prevention measures, that escalated the distress caused by a pandemic (Maunder, et al., 2006; Shanahan, et al., 2022), and could lead to many immediate and long-term negative socio-economical and psychological consequences for people (Meledandri and Trimarco, 2021).

Psychological well-being and mental health of individuals are mostly impaired during pandemics, including the COVID-19 pandemic (Pfefferbaum and North, 2020; Basheti, Mhaidat and Mhaidat, 2021). According to the research findings during previous pandemics (Matsuishi, et al., 2012; Bukhari, et al., 2016) increased levels of stress, anxiety, depression and traumatic stress often happened among individuals all over the world. In many studies on the outcomes of the initial period of the COVID-19 pandemic in winter-spring of 2020 they have reported the mentioned above negative psychological states as well as post-traumatic stress, anger, insomnia, confusion, grief and numbness in various samples of population (Tull, et al., 2020; Cao, et al., 2020; Xiang, et al., 2020; Kang, et al., 2020; Wang C., et al., 2020; Mazza, et al., 2020; Hyland, et al., 2020). All these reactions hindered adaptation to the new social and environmental requirements.

Up to now the pandemic has been going on for more than two years already, many people learned to adapt to the situation of pandemic. At the initial stage of the COVID-19 pandemic the stressful events were uncontrollable, unpredictable, overloading and exceeding the capacity to adapt, they affect greatly people's everyday life. With a progress of the pandemic, more and more people adapted to the stress of COVID-19, as an adaptation to stress is a manifestation of general mental health. The findings of some studies, revealing that the level of stress in 2021 if compared to 2020 was lower, proved it (Lupe, Keefer and Szigethy, 2020). On the opposite, a maladaptation to stress can lead to the development of sustainable depressive and anxiety symptoms (Muratori and Ciacchini, 2020). Moreover, adaptation to a pandemic may have a gender aspect: females have more difficulties associated with internalization, and males with externalization (Lohaus, et al., 2004).

Children and youngsters are vulnerable to various kinds of psychological and social negative impacts due to their personal immaturity and emotional instability. They could either underestimate or greatly overestimate threats and risks of the coronavirus pandemic. Stressors such as monotony of homestay lifestyle, frustration, lack of face-to-face communication with classmates, friends and teachers, lack of personal space at home, and family financial losses during quarantine could cause long-term adverse psychological and mental health outcomes in children (Wang G., et al., 2020). For example, introducing a new standard in social relations - social distancing – was harmful for socialization that's an important protective factor for emotional well-being in adolescents (Singh and Singh, 2020; Dalton, Rapa and Stein, 2020). Schools closure negatively affected the youngsters' daily routine (Qiu, et al., 2020). Children's leisure out of home was canceled: all creative studios, sports were closed, they were not allowed to go out with friends. Another important problem was moving the most part of everyday life in the virtual world due to lockdown.

The education system has been severely impacted by the COVID-19 crisis. The forced emergency transition of the education to the mode of distance and online education intensified the negative effects of the pandemic and significantly affected the quality of the educational process on all levels of education - from primary to high school education. Teachers and students, in addition to the general psychological problems caused by the pandemic, faced additional stress factors - the abruption of traditional school and university learning process, limited teaching resources and the methodological unpreparedness of some teachers to online education, the impersonal format of evaluating the results of mastering educational programs and exams grading, the lack of sufficient and important distance learning technical aids. Although online education was not new, but it was used as an additional resource but not as the main model in educational process. The interaction between subjects of educational process moved to impersonal format with the help of Teams, Zoom and other online platforms and programs (Harris, 2020). And soon after the pandemic outbreak an important paradox of online format of learning became obvious - students, whom teachers were supposed to teach distantly, were so-called "digital natives", those who from early childhood had high level technological knowledge and skills as they grew up in a digital environment and had digital socialization (Kamarianos, et al., 2020). This digital literacy gap between students and

educators could be harmful as reducing the traditionally authority and to some extent dominant role of the teacher. Therefore, all teachers, regardless of their IT competencies, had to think about changing the format of the lessons, the way of presenting information (Huber and Helm, 2020).

The COVID-19 pandemic affected the entire world and became a unique opportunity for scientists to assess the impact of stress on different samples within different cultures. People from different countries have their own unique understanding of the world, thus the response to stress can be culturally dependent. People are not passive recipients of social models of behavior and attitudes; they actively build their own perception of the world, based on their cultural traditions (Pines and Zaidman, 2003). For example, when comparing stress response in American and Asian cultures, it was found that Asians did not seek for social support in a stressful situation unlike Americans (Taylor and Asmundson, 2020). Cross-cultural studies showed that different cultures adhered to different patterns of stress response and of their relations with loved ones in a stressful situation (Adams and Boscarino, 2005).

The aim of this study was to find out if there were cross-cultural differences in perceived stress in Russian and Kyrgyz schoolchildren with high and low anxiety and depression levels during the initial stage of COVID-19 pandemic in 2020 and one year after in 2021 when the situation with pandemic was still severe and people suffered a lot for this period, and schoolchildren had already an experience of online / distant learning with more than half of a year.

The hypotheses of the present study are:

H1 – Schoolchildren are at risk regarding the development of stress and psychological symptoms, such as anxiety and depression, during the COVID-19 pandemic.

H2 - Schoolchildren with high as well as with normal levels of anxiety and depression from Russia and Kyrgyzstan demonstrate more pronounced perceived stress in 2021 in comparison to the initial stage of the COVID-19 pandemic in 2020.

H3 - There are cross-cultural differences in perceived stress in Russian and Kyrgyz schoolchildren with high levels of anxiety and depression both in 2020 and 2021.

Materials and Methods

Participants and Procedure

The study involved 1834 students aged 13 to 18 from Russia and Kyrgyzstan (Table 1). At the first stage (2020) 715 students took part in the study, and at the second stage (2021) - 1119 students from the same schools.

In Russia and Kyrgyzstan quarantine measures were introduced at the end of March, and since the 10th of April 2020 the learning process was switched into online mode. The data presented in the paper is a part of a larger project. There were two data collection periods in this project: (1) between 10th May, 2020 and 10th June, 2020; (2) between 18th May, 2021 and 15th June, 2021. The first period covered a time frame of the initial period of the COVID-19 pandemic, when lockdown, urgent school closures and online schooling were implemented in these countries. The second period time frame corresponded to the stabilization of the situation with COVID-19 pandemic in Russia and the new wave of pandemic expectation in Kyrgyzstan. Herewith in both countries preventing measures, such as social distancing and obligatory mask wearing were implemented, school children were back to offline schooling after at least half a year of distant/online learning experience.

This descriptive cross-sectional study was conducted via an online survey. The survey consisted of demographic variables, such as age, gender, year of schooling, and two validated self-reporting questionnaires - Hospital Anxiety and Depression Scale (HADS) and Perceived Stress Scale-10 (PSS-10). The data was collected using the DigitalPsyTools online platform (<https://digitalpsytools.ru/>), developed in the Center for Interdisciplinary Research in Education of the Russian Academy of Education.

Measures

Hospital Anxiety and Depression Scale (HADS, Zigmond and Snaith, 1983) was used to assess general levels of anxiety and depressive symptoms. The questionnaire includes 14 questions and 2 subscales: HADS-A consists of seven specifically designed items to measure the severity of anxiety symptoms, and the HADS-D consists of seven items to specifically measure the severity of depressive symptoms. Each item in HADS was rated on a four-point Likert scale, giving maximum score of 21. Total scores were divided into three categories: normal (0–7), borderline abnormal (8–10), and abnormal (11–28) cases of anxiety and depression. The Russian version of HADS questionnaire was used in the both countries (validation by Shal'nova, et al., 2014). Students both in Russia and Kyrgyzstan completed

questionnaires in Russian. In Kyrgyzstan, schoolchildren that study in Russian, took part in the survey.

The Perceived Stress Scale (PSS, Cohen, Kamarack and Mermelstein, 1983; Zhou and Lin, 2016) was used to assess stress levels in young people. The scale comprises of 10 items rated in our study on a five-point Likert scale, ranging from 'never' to 'very often'. The PSS-10 is a reliable measure of subjectively perceived stress levels over the past month. It has a two-dimensional structure, with one dimension related to perceived stress and the second related to stress resilience. In our study we used only total PSS score. The Russian version of PSS-10 was used to assess the actual stress level of respondents (Ababkov, et al., 2016).

We conducted a comparison of four independent groups of schoolchildren: Russian 2020, Kyrgyz 2020, Russian 2021, and Kyrgyz 2021.

Demographic features (age, gender) of the four cohorts were summarized using descriptive statistics (mean and standard deviation). Possible differences in demographic variables between groups were compared using Mann-Whitney test for continues variables. Study primary outcomes including perceived stress, anxiety and depression mean scores, and anxiety and depression severity levels were assessed using descriptive statistics. To assess the difference between groups/categories of anxiety, depression, perceived stress, we used the non-parametric Kruskal-Wallis test, since the variables did not have a normal distribution. After the discovery of statistically significant differences between groups, post hoc pairwise comparisons were made using the Mann-Whitney test. The analysis was performed using the SPSS v.24.0 statistical package (IBM, USA).

Results

Demographic characteristics

Demographic data (Table 1) showed that among Russian participants during the first data collection period in 2020 there were 595 schoolchildren (64,2 %, 382 girls), during the second data collection period in 2021 there were 639 schoolchildren (56,49%, 361 girls). Among Kyrgyz participants during the first data collection period in 2020 there were 120 schoolchildren (58,3%, 70 girls), during the second data collection period in 2021 there were 480 schoolchildren (56,45%, 271 girls). Mean age of Russian students in 2020 was 15,53 (SD = 1,15), in 2021 – it was 15,28 (SD = 1,16). Mean age of Kyrgyz students in 2020 was 16,04 (SD =1,04), in 2021 – it was 15,94 (SD = 0,86). The mean age in all groups were in the range of 15.5 and 16 years old.

Table 1
Sample summary

Sample	N	Russian 2020	Kyrgyz 2020	Russian 2021	Kyrgyz 2021
Females	1084	382	70	361	271
Males	750	213	50	278	209
All	1834	595	120	639	480
Age (M and SD)	15.58 (1.11)	15.53 (1.15)	16.04 (1.04)	15.28 (1.16)	15.94 (0.86)

Note. M - mean score, SD - standard deviation, N - number

Group differences in anxiety and depression levels

The descriptive statistics is presented in Table 2. The mean score of depression subscale for Russian schoolchildren in 2020 was 4.99 (SD 3.36), in 2021 was 5.17 (SD 3.52); for Kyrgyz schoolchildren in 2020 it was 6.18 (SD 3.5), in 2021 it was 5.68 (SD 3.2). The mean score of anxiety subscale for Russian schoolchildren in 2020 was 6.21 (SD 3.56), in 2021 was 6.54 (SD 3.67); for Kyrgyz schoolchildren in 2020 it was 6.63 (SD 3.89), in 2021 it was 7.15 (SD 3.86).

Table 2

Descriptive statistics of anxiety, depression and perceived stress in 4 groups

Group	measure	N	M	SD	Min	Max
R2020	Perceived stress (total score PSS-10)	597	25,50	6,139	10	44
	Anxiety (HADS)	595	6,21	3,558	0	18
	Depression (HADS)	595	4,99	3,356	0	17
K2020	Perceived stress (total score PSS-10)	120	25,88	6,06	13	40
	Anxiety (HADS)	120	6,63	3,892	0	17
	Depression (HADS)	120	6,18	3,498	0	14
R2021	Perceived stress (total score PSS-10)	639	25,83	5,838	10	45
	Anxiety (HADS)	639	6,54	3,664	0	18
	Depression (HADS)	639	5,17	3,523	0	17
K2021	Perceived stress (total score PSS-10)	480	27,06	6,398	10	46
	Anxiety (HADS)	480	7,15	3,855	0	20
	Depression (HADS)	480	5,68	3,214	0	16

Note. R2020 - Russian student in 2020, K2020 - Kyrgyz students in 2020; R2021 - Russian student in 2021, K2021 - Kyrgyz students in 2020; M - mean score, SD - standard deviation, N - number

Cross-cultural comparison showed that mean scores of anxiety subscale was significantly higher in Kyrgyz (7.15) to Russian (6.54) respondents in 2021 ($U=140867$, $Z = -2.343$, $p = 0.019$). The comparison of depression level between countries demonstrated significantly higher value in Kyrgyz respondents in 2021 ($U=137183$, $Z = -3.035$, $p = 0.002$) and in 2020 ($U=28485$, $Z = -3.510$, $p < 0.0001$). The main results in dynamics of anxiety and depression levels in Russian respondents from 2020 to 2021 suggested that the scores slightly increased. The same situation was with anxiety level in Kyrgyz respondents. However, the mean values of depression level in Kyrgyz respondents slightly decreased in 2021 (5.68) in comparison to 2020 (6.18).

The anxiety and depression severity levels in 4 groups were assessed according to scores corresponding to three categories: normal (0–7), borderline abnormal (8–10), and abnormal (11–28) cases of anxiety and depression. The individuals were afterwards grouped as Group 1 with normal and Group 2 with high (borderline abnormal + abnormal) levels of depression and anxiety (Table 3).

When analyzing the severity levels of depression, we found 22.9% of Russian schoolchildren and 38.3% of Kyrgyz with high levels of depression during the first stage of survey; and 26.4% of Russian schoolchildren and 29.8% of Kyrgyz with high levels of depression during the spring 2021. There were 32.9% of Russian schoolchildren and 37.5% of Kyrgyz with high levels of anxiety during the first stage of survey; and 38.3% of Russian schoolchildren and 42.5% of Kyrgyz with high levels of anxiety during the spring 2021. We found an increase in number of Russian schoolchildren with high levels of depression and anxiety. However, the percentage of schoolchildren with high level of depression decreased during the second year of pandemic in Kyrgyzstan.

Table 3
The percentage of girls and boys in groups with normal and high levels of anxiety and depression in 4 groups

group	gender	Measure			
		Level of Depression		Level of Anxiety	
		normal	high	normal	high
R2020	male	27.4%	8.4%	24.5%	11.3%
	female	49.7%	14.5%	42.5%	21.7%
	total	77.1%	22.9%	67.1%	32.9%
K2020	male	25%	16.7%	28.3%	24.2%
	female	36.7%	21.6%	34.2%	13.3%
	total	61.7%	38.3%	62.5%	37.5
R2021	male	31.7%	11.7%	29.7%	12.8%
	female	41.9%	14.7%	31.9%	25.6%
	total	73.6%	26.4%	61.7%	38.3%
K2021	male	31%	12.5	30.2%	13.3%
	female	39.2	17.3	27.3%	29.2%
	total	70.2%	29.8%	57.5%	42.5%

Note. R2020 - Russian student in 2020, K2020 - Kyrgyz students in 2020; R2021 - Russian student in 2021, K2021 - Kyrgyz students in 2020.

The analysis revealed that girls had significantly higher levels of anxiety than boys in groups of Russians with a normal level of anxiety in 2020 ($U = 14177$, $Z = -3.909$, $p < 0.0001$) and in 2021 ($U = 14868$, $Z = -4.038$, $p < 0.0001$); and in group of Kyrgyz schoolchildren in 2021 with a normal level of anxiety ($U = 6653$, $Z = -4.349$, $p < 0.0001$). There were no significant differences between male and females in all groups with normal levels of depression.

The analysis in groups with high levels of anxiety and depression from both countries showed the same pattern of negative emotional reactions: girls are more anxious by COVID-19 than boys among the cohort of Russians in 2020 ($U = 3580$, $Z = -2.002$, $p = 0.045$); and suffered more from pronounced depressive symptoms in the cohort of Russians in 2021 ($U = 2718$, $Z = -2.603$, $p = 0.009$). The opposite model of statistically significant pronounced depressive behavior was found in Kyrgyz boys in 2020 ($U = 166$, $Z = -2.120$, $p = 0.034$).

Group differences of situational stress levels in the COVID-19 pandemic in respondents with normal and high levels of anxiety and depression

The stress levels in 4 groups of schoolchildren were assessed using PSS questionnaire (Table 2). The level of situational stress in Russian schoolchildren in 2020 was 25.5 ($SD = 6.1$), in 2021 it remained mostly on the same level 25.8 ($SD = 5.8$). In Kyrgyz schoolchildren in 2020 it was 25.88 ($SD = 6.06$), in 2021 it increased to 27.06 ($SD = 6.398$), that was significantly higher ($U = 25921$, $Z = -1.69$, $p = 0.09$). According to the mean values, schoolchildren from both countries had moderate level of situational stress during 2 years of the COVID-19 pandemic. However, cross-cultural analysis showed significantly lower ($U = 138231$, $Z = -2.83$, $p = 0.09$) negative emotional reactions among Russian schoolchildren (25.9) in 2021 compared to Kyrgyz schoolchildren (27.1).

On the next step in perceived stress levels analysis participants were divided in 8 groups with normal and high anxiety (Table 4) and depression levels (Table 5):

- Russians with normal anxiety level;
- Russians with high anxiety level;
- Kyrgyz with normal anxiety level;
- Kyrgyz with high anxiety level;
- Russians with normal depression level;
- Russians with high depression level;
- Kyrgyz with normal depression level;
- Kyrgyz with high depression level.

Table 4

Perceived stress levels in schoolchildren with normal and high anxiety levels

Level of anxiety	group	PSS (total score)				
		N	Mean	SD	Min	Max
normal	R2020	399	23,48	5,65	10	41
	K2020	75	23,89	5,92	13	38
	R2021	394	23,52	5,40	10	38
	K2021	276	23,86	5,25	10	37
high	R2020	196	29,63	4,93	10	44
	K2020	45	29,18	4,74	19	40
	R2021	245	29,54	4,42	14	45
	K2021	204	31,39	5,15	18	37

Note. R2020 - Russian student in 2020, K2020 - Kyrgyz students in 2020; R2021 - Russian student in 2021, K2021 - Kyrgyz students in 2020; M - mean score, SD - standard deviation, N - number

Table 5

Perceived stress levels in schoolchildren with normal and high depression levels

Level of depression	group	PSS (total score)				
		N	Mean	SD	Min	Max
normal	R2020	459	24,39	6,05	10	40
	K2020	74	24,84	5,81	13	38
	R2021	470	24,79	5,59	10	45
	K2021	337	25,42	5,98	10	45
high	R2020	136	29,28	4,81	14	44
	K2020	46	27,54	6,14	13	40
	R2021	169	28,72	5,53	10	44
	K2021	143	30,92	5,66	16	46

Note. R2020 - Russian student in 2020, K2020 - Kyrgyz students in 2020; R2021 - Russian student in 2021, K2021 - Kyrgyz students in 2020; M - mean score, SD - standard deviation, N - number

To assess if there were statistical differences between high and normal levels of anxiety within 4 groups, we applied pairwise comparisons using the Mann-Whitney test (with p-value=0.05). In all 4 groups we found significant results: in group of Russians in 2020 on anxiety scale ($U = 15499.5$, $Z = -12.016$, $p < 0.0001$) and depression scale ($U = 16642.5$, $Z = -8.302$, $p < 0.0001$); in group of Russians in 2021 on anxiety scale ($U = 18410.5$, $Z = -13.184$, $p < 0.0001$) and depression scale ($U = 23548.5$, $Z = -7.870$, $p < 0.0001$); in group of Kyrgyz in 2020 on anxiety scale ($U = 821$, $Z = -4.709$, $p < 0.0001$) and depression scale ($U = 1244.5$, $Z = -2.476$, $p = 0.013$); in group of Kyrgyz in 2021 on anxiety scale ($U = 8517.5$, $Z = -13.088$, $p < 0.0001$) and depression scale ($U = 12211$, $Z = -8.563$, $p < 0.0001$). We found statistical differences in 4 groups of schoolchildren with high levels of anxiety (Kruskal-Wallis test, $H = 18.482$, $df = 3$, $p < 0.0001$), as well as with high levels of depression ($H = 15.371$, $df = 3$, $p = 0.002$).

Afterwards we applied post hoc pairwise Mann-Whitney test (with p-value=0.0085). The cross-cultural analysis of Kyrgyz schoolchildren with high level of anxiety in comparison with Russians showed

significant differences in perceived stress in 2021 ($U = 19703$, $Z = -3.874$, $p < 0.0001$). The perceived stress of Kyrgyz schoolchildren with high level of depression was significantly higher than in Russians in the same year ($U = 9630.5$, $Z = -3.098$, $p = 0.002$). There were significant results in dynamics of actual stress level from 2020 to 2021 in group in Kyrgyz schoolchildren with high level of anxiety ($U = 3441$, $Z = -2.634$, $p = .008$) and with high level of depression ($U = 2287.5$, $Z = -3.112$, $p = 0.002$) as well.

We found the gender differences (with p -value=0.05) in stress scores. The stress level in girls with high and normal levels of anxiety and depression was significantly higher than in boys in all 4 groups in 2021:

- with normal level of anxiety in 2021 ($U = 7539$, $Z = -2.964$, $p < .003$), and with high level of anxiety in 2021 ($U = 3361$, $Z = -2.867$, $p < .004$) in Kyrgyz in 2021;
- with normal level of depression ($U = 9652.5$, $Z = -4.909$, $p = .000$), and with high level of depression ($U = 1535$, $Z = -3.917$, $p = .000$) in Kyrgyz in 2021;
- with normal level of anxiety in 2021 ($U = 16824$, $Z = -2.267$, $p < .023$), and with high level of anxiety in 2021 ($U = 5778$, $Z = -2.133$, $p < .033$) in Russians in 2021;
- with normal level of depression ($U = 22940.5$, $Z = -2.858$, $p < .004$), and with high level of depression ($U = 2475.5$, $Z = -3.334$, $p < .001$) in Russians in 2021.

Discussions

In the present study we analyzed how schoolchildren from different countries reacted to a stressful situation of the COVID-19 pandemic in spring 2020 during the initial stage of the pandemic and transition to distant/online learning, and one year after in spring 2021, when schoolchildren in both countries already had a great experience of online learning and both countries survived some serious stressful accidents of COVID-19. The findings proved that schoolchildren were at high risk regarding the development of stress and adverse psychological symptoms, such as anxiety and depression, during the COVID-19 pandemic.

The analysis of the severity of anxiety and depression symptoms both in Russia and in Kyrgyzstan showed that the mean scores were in the upper range of the normal level, and the level of perceived COVID-19 stress was moderate. When we compared the results in levels of anxiety and depression between two periods of survey in 2020 and 2021, the same tendency was found both in Russia and in Kyrgyzstan: an increase in depressive and anxiety symptoms during the year after the initial period of coronavirus outbreak that could mean a decrease in a well-being of schoolchildren across a broad set of human activities at school, with family, and in social life. All these could lead to severe problems in life satisfaction, which's considered a predictor of mental and physical health and successful adaptation to life (Zhou and Lin, 2016). These findings are in line with previous studies (Lee, Kim and Wachholtz, 2016; Praherso, Tear and Cruwys, 2017; Rogowska, Kuśnierz and Bokszczanin, 2020). Therefore, it's supposed that at both periods of survey, the threat of being infected of a coronavirus was not so frightened and didn't cause dissatisfaction in schoolchildren as the restrictions in everyday life caused by it.

Cross-cultural comparison revealed that anxiety and depression levels of Kyrgyz schoolchildren were significantly higher than in Russians. When analyzing the severity levels, we found the percentage of schoolchildren with severe depression and anxiety symptoms were high in Kyrgyzstan as well. However, the number of schoolchildren in Kyrgyzstan, who suffered much from depressive symptoms at the initial stage, decreased in a year after the outbreak of pandemic, that could be the reason of adaptation to online/distant learning. At the initial stage of COVID-19 many negative emotions and distress were caused by the transition to online learning, as well as the deterioration of relations with parents. The crisis in the education system due to COVID-19 caused the lack of personal communication when children and youth could learn and develop important social skills such as self-confidence, friendship, empathy, respect, compassion, responsibility. Normally the school provides a structured environment for positive socialization and harmonious development of students. With distant/online learning, the process of socialization changed, and was distorted (Richards, 2020), despite the opportunities of virtual communication via internet and social networks. The learning process was also negatively influenced by the pandemic, many schoolchildren felt stressed and dissatisfied with online learning that replaced the face-to-face educational process. The main changes in the learning process during the pandemic concerned mostly such characteristics of formal school face-to-face education, as fixed curriculum, uniform teaching methods, and feasibility in personal contact and support from teachers.

The cross-cultural comparison showed that the levels of depression, stress, and anxiety were mostly higher in Kyrgyz schoolchildren than in Russians. The stress level in more than 15% of Kyrgyz respondents in 2020 and around 23% in 2021 was high. Our findings partly proved the hypothesis that

there were cross-cultural differences in perceived stress in Russian and Kyrgyz schoolchildren with high levels of anxiety and depression both in 2020 and 2021. We found out that the level of perceived stress of Kyrgyz schoolchildren with high level of depression as well as with high level of anxiety were significantly higher than in Russian respondents during the second stage of survey in spring 2021. Schoolchildren from Kyrgyzstan not from Russia with high levels of anxiety and depression demonstrated more pronounced perceived stress in 2021 in comparison to the initial stage of the COVID-19 pandemic in 2020. The pandemic had much greater negative impact on Kyrgyz students. One of the possible reasons of it are the differences in cultural traditions. Another possible reason can be the differences in governmental strategies in coping with pandemic, such as total lockdown, quarantine or preventive measures. In case of Russia and Kyrgyzstan comparison, both reasons played sufficient role. People from traditional cultures, such as in Kyrgyzstan, according to the results of large cultural studies, demonstrated more pronounced stress reactions compared (Persike and Seiffge-Krenke, 2012) to people from individualistic cultures (Kim, Sherman and Taylor, 2008), such as Russia.

The events that occurred in Kyrgyzstan since the initial period of pandemic in March 2020 till the June 2021 influenced the emotional reactions to COVID-19. The initial stage of COVID-19 pandemic in Kyrgyzstan was less stressful than in Russia. During the first period of survey in May 2020, despite the lockdown till the middle of May in Kyrgyzstan, the situation was not yet much threatening, many people didn't believe in the existence of the virus and the imminence of coronavirus crisis. Therefore, the results from the first data collection period showed lower level of stress, not pronounced negative emotions such as anxiety and depression. However, the real COVID-19 crisis in Kyrgyzstan happened in July 2020, when the country was on the first places in world's rating list in number of infected and died people. Since the mid of the 2020 and till the spring 2021 the country survived a lot of problems in all spheres of life, that led to a great political crisis with forcible overthrow of the government in Kyrgyzstan. Since April 2021 the situation with pandemic became worse and many people were frightened of a new wave of COVID-19, which occurred in middle of June 2021.

Gender can be considered as an important predictor of negative psychological reactions during the pandemic. The findings from previous studies (Wang G., et al., 2020) suggested that females were more prone to psychological stress than males. With regard to age characteristics, young people aged 16-18 demonstrated the highest level of psychological stress (Qiu, et al., 2020). In our study the analysis in four cohorts of schoolchildren with high levels of anxiety showed the same patterns of negative emotional reactions: girls are more anxious with COVID-19 than boys. The stress level in girls with high and normal levels of anxiety and depression was significantly higher than in boys in all 4 groups in a year after the initial stage of pandemic. Kyrgyz boys demonstrated significantly more pronounced depressive behavior in spring 2020. Young people in general, and females in most are sensitive to various kinds of negative effects and vulnerable to stressful events such as pandemics, due to their personal immaturity and emotional lability.

Conclusions

The COVID-19 pandemic brought significant mental problems that affected the psychological well-being and health of all people, and children and youth in particular. The crisis of pandemic was characterized by uncertainty, vulnerability, unpredicted outcomes, sufficient changes in quality of life which caused anxiety, emotional distress, depression in people. Nowadays we can assess factors and conditions that determine the life within the COVID-19, as well as short-term outcomes for a period of several years since the world wide outbreak of the COVID-19. However, the stressors caused by the pandemic could have delayed and long-term adverse outcomes. This is especially important to study on behalf of the younger generation, since they are the most sensitive and emotionally labile social group, actively responding to changes in their environment. On the other hand, psychological problems of schoolchildren were exacerbated by an additional important stress - a sharp transition to distance/online learning. Our findings disclosed important aspects of the impact of COVID-19 on schoolchildren, including cross-cultural differences and dynamics in development of stressful reactions, that is crucial as the emerging need of psychological aid and for supporting schoolchildren mental health.

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Conflict of interests

The authors declare no conflict of interest.

Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available due to compliance with institutional guidelines but they are available from the corresponding author on a reasonable request.

Informed Consent Statement

Informed consent was obtained from all respondents involved in the study before completing the survey.

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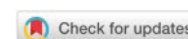
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Using Social Media Network by Special Education Teachers

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Abstract: This study aimed at identifying the use of the social media network (Facebook) and its relationship to psychological compatibility of special education teachers by answering four questions that include all the variables of the current study. The study used the descriptive approach and developed a scale to reveal the relationship of Facebook use and psychological compatibility. The psychological scale was applied to a random sample of special education teachers (n=520), who constitute 18% from the study population in Aseer region. The results of the study showed that the period that special education teachers spend using Facebook that received the highest frequency was less than two hours per day. The results revealed that the level of psychological compatibility among special education teachers, who use Facebook was high. There was a negative relationship between the period that special education teachers spend using Facebook and the level of psychological compatibility. The results also indicated that there were no statistically significant differences attributed to the effect of gender on the period of use of Facebook among special education teachers.

Keywords: social media networks, psychological compatibility, special education teachers.

Introduction

Social networks are defined as sites based on Internet technology and provide services to individuals; In order to build public or semi-public profiles across a limited system, indicating a list of users involved in communicating with an offer or bypass; i.e. blocking a list of communications made by other members within the same system during communication (Qaddom and Mohamed, 2019). Historically, the beginning of communication networks dates back to 1997 AD, when the six-degree network appeared as the first social network, and then the number of communication networks grew in quality and quantity until it has now reached more than 40 networks the most famous and widely used are Facebook and Twitter (Çakır and Tan, 2017). Social communication has a great impact on life, as millions of people wherever spend long hours on the sites of Facebook, Twitter, YouTube, and others; therefore it has been used in all areas of education (Çetinkaya and Sütçü, 2018).

A number of researchers in the field of digital education, such as Kert and Kert (2010), Al-Hussan (2015), and Qaddom and Mohamed (2019) agreed that social networks represent a compelling and prosperous environment for distinguished education and keep pace with technical and electronic progress worldwide. This is due to the fact that it is an important tool that students resort to following up on everything new in various social, scientific, and life issues; it has also become part of their daily lives, which they constantly follow through with their advanced smartphones (Connolly, Willis and Lloyd, 2019). Social media leads students to an open education that depends on communication and participation as a basis for the educational process and as an alternative to indoctrination (Dennen, Choi and Word, 2020).

Facebook is one of the most popular networking and social networking sites, enjoyed by the advantages its users find. It represents a tool to facilitate social communication for people who find it difficult to form social relationships, links and connections with others. Facebook is an electronic social

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media network that can be accessed free and users can create accounts and connect with each other. In this study, it is defined as a social media network used by the sample of the study and the period they spend on its usage (Aaen and Dalsgaard, 2016). Facebook may have a positive impact on social aspects. Individuals on these sites may create virtual communities that achieve interconnectedness and social communication based on their interests, ideas and trends (Stienfield et al., 2009). However, Mecheel (2010) indicated that social networking has changed the lifestyles of young special education teachers and the way they socialize with their virtual and real communities.

Social media networks affect people's social and psychological well-being differently. Psychological compatibility is yet another dimension that has been investigated alongside the effects of social media. The concept of psychological compatibility is one of the psychological concepts that has received great attention by psychologists. Psychological compatibility is the process by which the individual adjusts his psychological structure or behavior to respond to the conditions of the natural and social environment to achieve a sense of balance and contentment (Al-almi, 2011). Procedurally, it is defined as the total score obtained by the participants through their responses to the study tool. They agreed that it is a continuous dynamic interaction process between two basic poles, one of which is the individual, and the second is his/her physical and social environment (Abu Shamala, 2002). The concept of compatibility refers to the existence of harmonious relations with the environment that include the ability to satisfy most human needs, and to meet most of his/her biological and social demands. Accordingly, compatibility includes all the variations and changes in behavior, which are necessary in order to satisfy within the framework of the harmonious relationship with the environment (Boutros, 2008).

The results of several studies such as Alshadifat and Al-Qudah (2017), Al-Harbi and Al-Arabi (2019), Al-Sharari and Al-Shamayleh (2020) and BinGhaida (2020), have indicated the relationship between Facebook use and psychological compatibility and mental health manifestations of the individuals. Paradise and Sullivan (2012) indicated that addiction to Facebook use leads to social isolation, and using it in a moderate way leads to good levels of psychological and social compatibility. No studies tackled the relationship between Facebook and psychological compatibility directly among special education teachers, which triggers the need to conduct the current study. Therefore, the purpose of this study is to identify the use of the social media network (Facebook) and its relationship with psychological compatibility among special education teachers.

Research has been done on the use of social networks by teachers, Al-Sharari and Al-Shamayleh (2020) identified the risks of social media usage by secondary school students from the viewpoints of Qurayyat teachers in the Kingdom of Saudi Arabia. The study followed the descriptive method and for collecting the study data, it adopted a questionnaire. The study instrument was administered to 288 teachers during the second semester of the academic year 2019/2020. The results of this study indicated that the general level of risks resulting from the use of high school students for social media from the viewpoints of secondary school teachers in Qurayyat administration was high. The results also showed that Twitter was the most dangerous social networking sites.

Research has been done on the use of social networks by professors, BinGhaida (2020) explored the level of the use of university professors in the Department of Media and Communication Sciences and Library Science at the University of Batna for social networking sites (SNS) and areas of their use of those networks. This study followed the descriptive analytical method. To collect information from the research sample, an electronic questionnaire was used. The study sample consisted of 23 professors. The results showed that all university professors are using social networking sites, and the most used by professors for various purposes was Facebook. They use the website to obtain information sources to benefit from them in the completion of new research projects and the preparation of rich lectures.

Research has been done on the use of social networks by Libyan students' parents, Hamid (2006) studied the relationship between self-esteem and personality trait narcissism with Facebook addiction. The sample of the study consisted of 355 participants, from which 124 were men and 231 women, all aged from 14 to 45. Questionnaires were used to collect the data where they uploaded three questionnaires on google forms and sent the link to the participants. The results of this study indicated that participants more inclined towards Facebook addiction when they have low self-esteem and with high narcissistic trait more than participants with high self-esteem and low narcissism did.

Research has been done on the use of social networks by students, Al-Harbi and Al-Arabi (2019) examined the level of use of social networks and their relation to social variables by Qaseem University students. For data collection in this study, the descriptive survey approach was used. The sample consisted of 979 male students. The results showed that the humanities faculties' students were using social networks more than students of the scientific faculties were. The main purpose for using social networks was for entertainment, and that the most used social network was Twitter and YouTube. The

study also showed that the use for social networks was high with about 34.9% on a daily base on average of about 4 hours a day. Students from families with incomes between 5000-9999 SAR were usually using social networks for 7 hours at least every day.

Research has been done on the use of social networks by students, [Al-Ahmad \(2019\)](#) investigated the reality of the use of Kuwait University students for social networking sites to identify the most important forms of violence and extremism that students practice through social media. The study aimed also to identify the most important differences around the reality of Kuwait University students' usage of social media websites and their attitudes towards violence and extremism and the reasons behind that, depending on the gender, the college, the school group, the father's level of education, the mother's level of education, and the place of living. The descriptive method was used in this study and the sample consisted of 2400 male and female students at the university. For data collection, a questionnaire consisted of (4) dimensions were used. The result showed that students experience various forms of cyber violence over social media networks largely, and the most common forms of cyber violence used were spreading rumors, lies, and direct and indirect insults.

Research has been done on the use of social networks by students, [Alshadifat and Al-Qudah \(2017\)](#) identified the relation between psychological loneliness and social network site usage and other elements such as (gender, duration of browsing and type of the disability) among students with visual disabilities in Jordan. The descriptive correlational research design was used in order to accomplish objectives of this study, and UCLA Loneliness Scale was used to collect the data for this study and were treated with statistical package SPSS. The study sample consisted of 410 students from which 68 were randomly selected from the Royal Academy for the Blind in Jordan who are in the second semester of the academic year 2014-2015. The results of the study showed that social networks decreased the level of loneliness among students with Visual Disabilities and the presence of statistically significant differences in the level of loneliness based on the gender.

Questions of the study

The current study seeks to answer the following questions:

1. How many hours do special education teachers spend on Facebook?
2. What is the level of psychological compatibility among special education teachers who use Facebook?
3. What is the relationship of the time (number of hours) that special education teachers spend using Facebook with the level of psychological compatibility?
4. Does the time special education teachers spend on Facebook differ by gender?

Significance of the study

This study dealt with Facebook, which affected society, its ideas and trends, but had a great impact on the political and social arena in the whole world, and the Arab world in particular. Society's interest, especially youth, has increased in using social media networks, resulting in having an account for each person on Facebook. These accounts became a window to the external community and an identity mark that distinguishes people from others. Facebook has become one of the most important sources of social influence and impact. This study is useful in highlighting the role of Facebook in the psychological compatibility of special education teachers in the Arab community in general and the Saudi society in particular. This study can add information about Facebook use and its relationship with psychological compatibility among special education teachers.

From a practical perspective, this study can be useful for educational counselors, managers and teachers to identify the effect that Facebook and social media have on the psychological and social variables of special education teachers, especially with regard to their psychological compatibility. The results of the study would help directing decision-makers in drawing up educational policies and educational decisions, and taking into account the revolution of communications and social media and its role in bringing about psychological change among teachers.

Materials and Methods

The correlational descriptive approach was used in this study, which is based on studying the relationship between the use of Facebook and the psychological compatibility of special education teachers.

Sampling

The study sample was chosen randomly from schools and special education centers in Aseer region, and their percentage was 18% from the study population. The number of special education teachers participating in this study was 520, including 205 males and 315 females. 40 questionnaires were excluded due to the fact that teachers do not use Facebook in the educational process, and 14 questionnaires were excluded due to incomplete data. Thus, 466 respondents were included in the analysis, including 168 males and 298 females.

Instrument of the study

The researcher developed a scale to reveal the relationship of Facebook uses with the psychological compatibility of special education teachers. The study reviewed the related literature and previous studies to develop the instrument from [Paradise and Sullivan \(2012\)](#) and [Al-Harbi and Al-Arabi \(2019\)](#). The primary form of the questionnaire consisted of two parts: the demographic data and the extent of use Facebook and how much time they spend using Facebook. Duration of use is the length of time (number of hours) that special education teachers spend using Facebook. For the purposes of this study, the duration of use will be divided as follows; more than zero hours and less than two hours (low level), more than two hours and less than four hours (medium level), and more than four hours (high level). The second part included the psychological compatibility scale consisting of (58) items, distributed into three dimensions, personal compatibility, family compatibility, and social compatibility.

Validity of the instrument

To verify the validity of the psychological compatibility scale, two methods were used, the first was by finding the content validity and the second by the construct validity. After preparing the instrument, the researcher sent a letter to 10 professors in Saudi universities to express their opinion on the validity of the instrument; its ability to measure what it was prepared for, the clarity of the items and the accuracy of the linguistic wording. The researcher deleted and modified the items based on their observations and recommendations, and keep the items that have a percentage (80%) in agreement which the numbered of (51) items.

The construct validity of the instrument was verified by calculating the correlation coefficient for each item of the scale with the instrument as a whole and with the dimension to which it belongs, and between dimensions with each other and the total score. The correlation coefficients for the items and the tool as a whole ranged from (0.30-0.80) as shown in Table 1.

Table 1

Correlation coefficients between items, total degree, and the dimension to which the items measure

Item number	correlation with dimension	correlation with instrument	Item number	correlation with dimension	correlation with instrument	Item number	correlation with dimension	correlation with instrument
1	.45(**)	.35(*)	22	.80(*)	.61(*)	43	.65(*)	.48(*)
2	.54(**)	.41(*)	23	.72(*)	.56(*)	44	.57(*)	.48(*)
3	.45(**)	.46(*)	24	.48(*)	.47(*)	45	.53(*)	.38(*)
4	.56(**)	.42(*)	25	.48(*)	.39(*)	46	.61(*)	.42(*)
5	.39(**)	.36(*)	26	.72(*)	.56(*)	47	.42(*)	.33(*)
6	.65(**)	.47(*)	27	.79(*)	.62(*)	48	.58(*)	.48(*)
7	.30(**)	.38(*)	28	.69(*)	.61(*)	49	.38(*)	.36(*)
8	.49(**)	.46(*)	29	.59(*)	.50(*)	50	.61(*)	.50(*)
9	.50(*)	.54(*)	30	.61(*)	.46(*)	51	.66(*)	.52(*)
10	.63(*)	.64(*)	31	.30(*)	.32(*)			
11	.35(*)	.38(*)	32	.72(*)	.61(*)			
12	.31(*)	.39(*)	33	.35(*)	.37(*)			
13	.47(*)	.35(*)	34	.35(*)	.36(*)			
14	.55(*)	.34(*)	35	.38(*)	.33(*)			
15	.51(*)	.38(*)	36	.55(*)	.44(*)			
16	.56(*)	.41(*)	37	.60(*)	.45(*)			
17	.48(*)	.37(*)	38	.39(*)	.33(*)			
18	.72(*)	.56(*)	39	.51(*)	.51(*)			
19	.77(*)	.59(*)	40	.66(*)	.48(*)			
20	.80(*)	.62(*)	41	.47(*)	.37(*)			
21	.82(*)	.64(*)	42	.68(*)	.56(*)			

* Statistically significant at (0.01), ** Statistically significant at (0.05)

Table 1 shows that all the correlation coefficients were of acceptable scores and statistically significant. Therefore, none of these items was deleted, and the correlation coefficients between the dimensions of the instrument were calculated. The correlation coefficients of the dimensions with each other ranged from (0.432-0.781) as presented in Table 2.

Table 2

Correlation coefficients between the dimensions of the instrument

Dimension	Personal compatibility	Family compatibility	Social compatibility	Total
Personal compatibility				
Family compatibility	.482(*)			
Social compatibility	.512(*)	.432(*)		
Total	.767(*)	.781(*)	.780(*)	

* Statistically significant at (0.01), ** statistically significant at (0.05)

Table 2 shows that all the correlation coefficients between the dimensions of psychological compatibility scale were of acceptable scores and statistically significant at.

Reliability of the instrument

To verify the reliability of the instrument, the researcher selected a random sample (n=63) from other than the study sample and from the same school community to conduct a pilot study. Cronbach alpha coefficient was used to calculate the stability on the first application, which was (89%). According to [Bryman and Bell \(2011\)](#) and [Saunders, Lewis and Thornhill \(2016\)](#), a value of (60%) or above indicates an acceptable level of response reliability. Table 3 shows the reliability ratios for the dimensions of the psychological compatibility scale and the overall score of the scale.

Table 3

Reliability ratios for the dimensions and the overall score using Cronbach Alpha

Dimension	Cronbach Alpha
Personal compatibility	0.75
Social compatibility	0.81
Family compatibility	0.75
The total score of the Psychological Compatibility Scale	0.89

Table No. 3 shows that the values of the reliability coefficient Alpha - Cronbach ranged between 0.75 - 0.81, while the reliability value of the tool as a whole was 0.89. This indicates that the instrument has an appropriate degree of reliability that enables it to be used for the purposes of the study.

Research Procedure

After confirming the validity and reliability of the study instrument, the researcher completed the regular procedures by taking the official approval for the application of the study instrument, then distributed the study instrument to the study sample of (466) teachers of special education in the Asir region. The researcher personally distributed the instrument to the sample members, asking them to fill it out accurately and objectively. The researcher explained to them that this study was only used for scientific research purposes. The researcher retrieved the questionnaires after two weeks from the study sample members.

Data Analysis

To achieve the objectives of the study and analyze the collected data, a number of appropriate statistical methods were used using the Statistical Package for Social Sciences (SPSS). After the data was encoded and entered into the SPSS program, the scores were distributed according to the following categories in Table 4:

Table 4

Distribution of categories according to the gradation used in the research instrument

Mean	The description
1.00-2.33	Low
2.34-3.67	Medium
3.68-5.00	High

This study relied on some descriptive and inferential statistics methods to describe the characteristics of the sample, describe the data, and answer the study questions as follows: Pearson's correlation coefficient to find out the validity of the internal consistency of the study instrument, the "Cronbach's alpha" coefficient to ensure the reliability of the instrument, Frequency and percentage: to describe the characteristics of the research sample and determine the responses of its members to the items of the questionnaire, mean score: to arrange the items according to importance to the results of the study, Standard deviation: to clarify the extent of the dispersion of the responses of the sample members and to know the statistically significant differences between the means of the answers of the study sample due to the study variables by using the chi-square test.

Results and Discussion

Results of the first question

"How many hours do special education teachers spend on Facebook?"

To answer this question, the frequencies and percentages of the duration of usage special education teachers spend using Facebook were extracted, as shown in Table 5.

Table 5

Frequencies and percentages of the duration of usage special education teachers spend using Facebook

Variable	Category	Frequency	Percentage
Duration of using Facebook	Less than two hours a day	233	50.0
	From 2 hours to less than 4 hours a day	141	30.3
	More than 4 hours	92	19.7
total		466	100.0

Table 4 shows that the duration of Facebook use, less than two hours per day, came with the highest frequency of (233) and a percentage of (50.0), and followed by the duration of from two hours to less than 4 hours with a frequency of (141). On the other hand, the duration of more than 4 hours came last, with a frequency of (92) and a percentage of (19.7). The results of the study on the duration of time that special education teachers spend on Facebook are in agreement with the results of [Paradise and Sullivan \(2012\)](#), where they revealed that the average use of Facebook by the participants is (2.76) once a day, and for a period of (35.06) minutes each time.

The result of this question indicates that participants' usage of Facebook recorded the lowest levels of usage calculated by the hour per day, as most of the participants used Facebook for less than 2 hours per day. The reason for this result may be attributed to the variety of forms of usage by special education teachers on the Internet. They may use it for educational, entertainment, and personal purposes, and among those usages, they use the social media network, Facebook. Their use of the Internet may be more than two hours per day, but the share of their use of Facebook was less than two hours. The reason for this result may also be due to the financial cost of using the Internet, and this affects the period of use, which reduces the use periods to less than two hours per day.

Results of the second question

"What is the level of psychological compatibility among special education teachers who use Facebook?"

To answer this question, mean scores and standard deviations of the level of psychological compatibility of special education teachers, who use Facebook were extracted, and Table 6 illustrates the results.

Table 6

The mean scores and standard deviations of the level of psychological compatibility among special education teachers

No. of dimension	Dimension	Rank	Mean score	Standard deviation	level
2	Family compatibility	1	3.94	.600	High
3	Social compatibility	3	3.75	0.49	High
1	Personal compatibility	2	3.74	0.54	High
Total score			3.80	0.43	High

Table 5 shows that the total mean score of the psychological compatibility of special education teachers was (3.80), which corresponds to the high level, where the mean scores ranged from (3.74-3.94). The dimension of family compatibility came in first rank with the highest mean score of (3.94) and a high level, followed by the dimension of social compatibility with a mean score of (3.75) and a high level. The dimension of personal compatibility came in the last rank with a mean score of (3.74), and with a high level. The mean scores and standard deviations of the responses of the study sample were calculated for the items of each dimension separately, as follows:

Personal compatibility Dimension

To reveal the level of the personal compatibility of special education teachers who use Facebook, the mean scores and standard deviations were calculated as shown in Table 7.

Table 7

The mean scores and standard deviations for the items of the personal compatibility dimension arranged in descending order according to the mean score

Rank	No. of item	Item	Mean score	Standard deviation	Level
1	12	I take care of my appearance.	4.49	.750	High
2	3	I trust myself.	4.38	0.90	High
3	11	I take care of my teeth hygiene.	4.31	0.97	High
4	17	I suffer from obesity	4.01	1.19	High
5	16	I have manifestations of physical weakness.	3.98	1.06	High
6	9	I feel like a person of value in this life.	3.88	1.01	High
7	14	My stomach hurts a lot.	3.87	1.17	High
8	6	I feel miserable.	3.86	1.21	High
9	4	I suffer from depression.	3.82	1.15	High
10	10	I feel psychological comfort in my life.	3.61	1.10	Medium
11	15	I feel constant headaches.	3.60	1.27	Medium
12	2	I get angry for the simplest reason.	3.55	1.28	Medium
13	5	I cry quickly.	3.44	1.44	Medium
14	8	I feel lucky.	3.30	1.19	Medium
15	1	My patience runs out easily with others.	3.26	1.26	Medium
16	13	I feel physically tired quickly.	3.23	1.20	Medium
17	7	I talk about my accomplishments in front of others.	3.00	1.15	Medium
Total score for personal compatibility			3.74	.540	High

Table 7 shows that the mean scores of the items in the personal compatibility dimension ranged from (3.00 - 4.49). Item No. (12), which states "I care about my appearance" came in first place with a mean score of (4.49), while item No. (7), "I talk about my accomplishments in front of others," ranked last, with a mean score of (3.00). The mean score of the overall personal compatibility dimension was (3.74).

Family compatibility Dimension

To reveal the level of the family compatibility of special education teachers who use Facebook, the mean scores and standard deviations were calculated as shown in Table 8.

Table 8

The mean scores and standard deviations for the items of the family compatibility dimension arranged in descending order according to the mean score

Rank	No. of item	Item	Mean score	Standard deviation	Level
1	18	I love my family.	4.57	.77	High
2	30	I am proud of my family in front of others.	4.41	.93	High
3	19	I have good relations with my family members.	4.38	.91	High
4	29	I hope to have a family other than mine.	4.36	1.08	High
5	22	I feel comfortable at home.	4.21	1.04	High
6	32	I am happy when I meet with my family.	4.17	.96	High
7	23	I bring happiness to my family.	4.11	1.04	High
8	21	I feel understanding with my family at home.	4.07	1.12	High
9	20	I live a quiet family atmosphere.	4.04	1.14	High
10	28	I feel that I have an active role in my family.	4.03	1.01	High
11	27	My family respects my opinion.	3.98	1.02	High
12	26	My parents trust my opinions.	3.91	1.04	High
13	31	My parents treat me like a child.	3.88	1.21	High
14	25	My parents constantly criticize me.	3.70	1.22	High
15	33	I disagree with my parents in running the house.	3.30	1.17	Medium
16	24	I feel like running away from home.	1.98	1.28	Low
Total score for family compatibility			3.94	.60	High

Table 8 shows that the mean scores of the items in the family compatibility dimension ranged from (1.98 - 4.57). Item No. (18), which states, "I love my family" came first with a mean score of (4.57). Item (24), "I feel like running away from home" ranked last, with a mean score of (1.98). The mean score of the overall family compatibility dimension was (3.94).

Social compatibility Dimension

To reveal the level of the social compatibility of special education teachers who use Facebook, the mean scores and standard deviations were calculated as shown in Table 9.

Table 9

The mean scores and standard deviations for the items of the social compatibility dimension arranged in descending order according to the mean score

Rank	No. of item	Item	Mean score	Standard deviation	Level
1	46	I feel happy when meeting my friends.	4.27	.94	High
2	36	I sit alone at social events.	4.20	1.01	High
3	37	I am popular with my friends.	4.18	.84	High
4	50	I am a fun person.	4.17	1.00	High
5	42	I enjoy talking to others.	4.04	1.00	High
6	45	I find it difficult to share my conversation with my friends	4.01	1.20	High
7	41	I find it difficult to make new friends.	3.99	1.12	High
8	51	I feel happy just being among people.	3.98	1.01	High
9	43	I feel I belong to the group of my friends.	3.96	1.05	High
10	48	I miss social events.	3.90	1.06	High
11	39	I suffer from loneliness even if I am with others.	3.87	1.29	High
12	44	I enjoy visiting people.	3.85	1.07	High
13	40	I take the initiative to talk to people.	3.83	1.04	High
14	34	I feel a social responsibility towards society.	3.54	1.10	Medium
15	47	I am often the leader among my friends.	3.44	1.13	Medium
16	35	I hesitate to go alone into public meetings.	3.38	1.19	Medium
17	49	I ask others to help without being embarrassed.	2.86	1.24	Medium
18	38	I stay away from group discussions with my friends.	2.05	1.15	Low
Total score of social compatibility			3.75	.49	High

Table 9 shows that the mean scores of the items of the social compatibility dimension ranged from (2.05 - 4.27). Item No. (46), which states "I feel happy when meeting my friends" came first, with a mean score of (4.27). Item No. (38), "I stay away from group discussions with my friends," ranked last, with a mean score of (2.05). The mean score of the social compatibility dimension as a whole was (3.75). This result may be attributed to the fact that special education teachers, who use within reasonable limits, combine two things that work to increase their levels of psychological compatibility. They have a continuation of contact with the virtual community that expresses the actual social reality. It also allows communicating with members of the global community, in addition to communicating with the local community.

Therefore, it is evident from the interpretation of this result that the use of Facebook for a limited period in a way that does not lead the individual to neglect his social, family and academic roles and duties. Using Facebook with limits also helps in reducing the chance to reach the point of addiction. A limited use will also lead to improving levels of psychological health, and contribute to achieving psychological, social, personal, family and academic compatibility.

Results of the third question

"What is the relationship of the time (number of hours) that special education teachers spend using Facebook with the level of psychological compatibility?"

To answer this question, the Pearson correlation coefficient was extracted between the periods of time special education teachers spend on using Facebook and the level of psychological compatibility as shown in Table 10.

Table 10

Frequencies, percentages, and Pearson's correlation coefficient between the time periods that teachers spend using Facebook and the level of psychological compatibility

		Duration			Total
		Less than two hours a day	From two hours to less than 4 hours a day	More than 4 hours	
Level of psychological compatibility	Low	1	0	1	2
		.2%	.0%	.2%	.4%
	Meduim	68	54	40	162
		14.6%	11.6%	8.6%	34.8%
	High	164	87	51	302
		35.2%	18.7%	10.9%	64.8%
Total		233	141	92	466
		50.0%	30.3%	19.7%	100.0%

Pearson correlation coefficient, $R = -.126^{**}$, statistical significance = .007

Table 10 shows that there is a negative relationship with statistical significance between the duration of time that special education teachers spend using Facebook and the level of psychological compatibility. The value of R was (-0.126), with a statistical significance of (0.007). It is evident from Table 9 that the higher the level of psychological compatibility the less time spent on Facebook. The result of this question indicates that the frequent use of Facebook and the length of time that teachers spend on this website may negatively affect their psychological compatibility. The more time an individual uses Facebook, the levels of psychological compatibility will decrease, so it is a reverse negative process. [Al-Tayyib \(2012\)](#) pointed out in that the virtual community created by social media networks such as Facebook represents a negative society, where the person loses the ability to interact and deal with the realities of social life and with the people around him, which leads to low levels of social compatibility among the user.

This result does not mean that the use of Facebook leads to a lower level of psychological compatibility in general, but rather it may indicate the advantages of using Facebook according to controls and conditions related to the time and period of time used. The reasonable socially acceptable limit is like the time period specified in this study, less than two hours. This kind of use may accustom the individual to many positive aspects, and it may help the individual in his psychological, social, family, and personal adaptation. However, if this period of using Facebook is increased, it may affect the individual's psychological compatibility negatively.

These results agree with [Awad \(2012\)](#) which revealed that spending a long time on Facebook affects the psychological and social compatibility. [Al-Ahmad \(2019\)](#) also indicated that the social media networks, such as Facebook has a positive effect on social aspects. Individuals on these websites may create virtual societies that achieve interconnectedness and social communication based on their interests, ideas and attitudes. In addition, [Mecheel \(2010\)](#) indicated that social media networks changed people's lifestyles and social interactions with their virtual and real communities.

Results of the fourth question

"Does the time special education teachers spend on Facebook differ by gender?"

To answer this question, the frequencies and percentages of the period of using Facebook for special education teachers were extracted according to the gender variable as shown in Table 11 below.

Table 11

Frequencies and percentages for the duration of using Facebook for special education teachers according to the gender variable

Variable		Gender		Total
		Male	Female	
Duration	Less than two hours a day	76 45.2%	157 52.7%	233 50.0%
	From 2 hours to less than 4 hours a day	51 30.4%	90 30.2%	141 30.3%
	More than 4 hours	41 24.4%	51 17.1%	92 19.7%
	Total	168 36.05%	298 63.95%	466 100.0%

Statistical significance: P= 130

Table 11 shows the frequencies and meanscore of the time spent using Facebook for special education teachers according to their gender. The researcher did not find a study that agreed with the result of this question. This result of the current study differed from the result of [Awad \(2012\)](#), which indicated that there were statistically significant differences in the degree of psychological compatibility among Facebook users due to gender and in favor of females. This result indicates that the use of Facebook is not related to gender. Everyone may have an account on the Facebook website, whether male or female, without restrictions or controls. Registration on the Facebook website allows every individual to use the features for communication, chatting, commenting, informative and informative addition to the page of your site, regardless of your gender.

This result may be attributed to the pattern of family upbringing among the participants. They do not differentiate in parental treatment between males and females, and this leads to giving females freedom to participate in social media websites such as Facebook and leads to no difference between males and females in the duration of using Facebook. The reason for this result may be attributed to the wide availability of means of communication and the Internet in various societies. The Internet has entered every home and has become an urgent need for all family members. Facebook is one of the free websites available on Internet pages, in addition to its ease of use.

Conclusion

The objective of this study was to examine the use of the social media network (Facebook) and its relationship to the psychological compatibility of special education teachers. In fact, based on the survey carried out amongst special education teachers in the Aseer region, it was revealed that the level of psychological compatibility among special education teachers, who use Facebook was high. Despite the educational opportunities that Facebook presents, it was noted that the negative relationship between the period that special education teachers spend using Facebook and the level of psychological compatibility. The results of this study are limited by the extent of accuracy of extracting the validity and reliability of the instrument prepared by the researcher, the possibility of generalizing the results only to samples similar to the current sample, and the extent to which the sample represents the population. However, since social networking websites are here to stay, the study recommends using social media networks,

especially Facebook, to serve the educational process, by activating communication between teachers and students, and between the school and parents. It is recommended to conduct studies that attempt to uncover the causes of the psychological, social, educational, and academic effects of Facebook use on special education teachers. It is also recommended to conduct an educational study on the disadvantages and benefits of using Facebook for special education teachers and students of all ages.

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Conflict of interests

The authors declare no conflict of interest.

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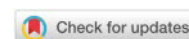
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The Development of Critical Thinking Skills in Mobile Learning: Fact-Checking and Getting Rid of Cognitive Distortions

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Abstract: The study aims to reveal the attitude of students and teachers to mobile learning; explore the possibility of developing critical thinking skills in mobile learning; and also evaluate knowledge after a short training course involving the use of mobile technologies in the context of the development of critical thinking. The research relies on an interview and a test. It was attended by 275 people (93 teachers and 182 students). The results showed that 58% of teachers and 55% of students believe that mobile learning does not contribute to the development of critical thinking. The test results showed that the study participants who pre-listened to the course of lectures on their mobile devices did not cope with the questions well enough, and cognitive errors were identified. The research has shown that improving the skills of interpreting, analyzing, evaluating and explaining information can increase the effectiveness of mobile learning. The research is a contribution to the study of various aspects of the impact of mobile learning on students and will be of interest to teachers, students, academic administration, parents, as well as to those who are interested in modern pedagogy and educational psychology.

Keywords: cognitive errors, critical thinking, development of critical thinking, getting rid of cognitive distortions, mobile learning.

Introduction

The rapid development of digital technologies, as well as the events of the last two years (the Covid-19 pandemic, lockdown) have made the use of mobile learning almost mandatory for pupils and students around the world (Demir and Akpinar, 2018). Mobile learning is a form of distance learning delivered with the help of handheld devices. This is a new kind of opportunities allowing students to gain new knowledge that occurred due to the development of teaching technologies (Cahyana et al., 2018).

Many researchers, in particular in developed countries, see a number of benefits of mobile learning. For example, both teachers and students in the United States note the positive impact of digital technology on learning. Educators see a number of positive benefits of digital teaching tools; 52% note that their students are more motivated to learn, 36% are confident that students develop creativity, 29% believe that problem solving and critical thinking are improving, 7% say their students put knowledge into practice, 26% believe that students take responsibility for their learning (West, 2013).

Despite the fact that not all countries and not all segments of the population can afford to use mobile devices and the Internet, most people have them. Despite the fact that students demonstrate an interest in mobile learning, they are not yet ready enough to implement it and do not know how it can facilitate the learning process (Ismail, Azizan and Gunasegaran, 2016). Few learners have experience

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of effective application of mobile learning, solid assimilation of knowledge in the course of such learning; there are also problems with time management, information quality control, etc.

The main and most important practical value of mobile learning is the use of portable technologies and devices in the learning environment to overcome issues of time and place. In addition to this change in education with wide access to information, communication, and cooperation developed a number of skills in students. Among them is the ability to create students' own learning context interacting with each other and the environment in the real and virtual worlds (Al-Adwan, Al-Madadha and Zvirzdinaite, 2018). It is worth defining the difference between variable online learning and mobile learning. The second option involves the use of gadgets both outside the classroom and directly in the classroom (these two formats can alternate in modern realities). Online learning is a purely distance form of education using mobile technologies (Singh and Thurman, 2019).

In the learning process, it is important to observe regular progress; it should maximize the development of useful qualities and skills. It is also important to exclude or minimize the possible negative impact of teaching methods on students, especially on children.

Today one of the most important skills is critical thinking. It allows people to adequately respond to the events of the world around and make the right informed decisions (Hitchcock, 2020). The issue of developing critical thinking in mobile learning is one of the most important in the modern pedagogical environment as in this type of training there is a number of features, such as the lack of direct contact with the teacher, the lack of communication with peers, the problem of the quality of information on the Internet, etc. (Larsson, 2017). These problems often lead to the emergence of cognitive distortions that impede the high-quality assimilation of educational information by students. Due to the fact that mobile learning is almost inevitable today, it is necessary to search for ways and means of its development and application in this type of learning.

Nowadays, information is a commodity and its accuracy should always be checked. Fact-checking is one of the basic elements not only of science but also of any other activity (López-García, Costa-Sánchez and Vizoso, 2021). There are specific methods of verification that are specific to each science, as well as universal methods for any field of activity, such as economics, physics, and chemistry.

This study aims to explore the ways of developing critical thinking skills in mobile learning and overcoming cognitive distortions that arise in its process. The two assumptions (hypotheses) made on the basis of the literature review have been tested: hypothesis 1 – mobile learning significantly contributes to the development of critical thinking, hypothesis 2 – cognitive distortions are often experienced by learners using mobile devices.

The research is a study aimed at studying the benefits and / or harm of mobile learning, its impact on the development of critical thinking in students, emerging cognitive distortions and ways to solve existing problems.

Literature review

Mobile learning is a type of learning that allows learners to make their studies independent of place and time. When using educational technologies, the learner plans, arranges, implements and evaluates their studies as it is them who manage these activities. Accordingly, the student is not a passive person who receives the information needed but a person who uses cognitive and mega-cognitive abilities to complete a task. Therefore, a mobile learning user improves their higher-order thinking skills (Sönmez et al., 2018). One of the studies was aimed at the configuration of hybrid laboratories with a virtual component of strong learning and variables (stationary and mobile). Just such a variable, a physical component, is especially needed at the initial stages of mastering laboratory equipment: stationary devices are studied in educational laboratories and in real geodetic practice, portable counterparts (Hernández-de-Menéndez, Vallejo Guevara and Morales-Menendez, 2019).

Mobile learning is beginning to enter the life of people and the attitude towards it is ambiguous. According to scientists, the introduction of technology to students and their wider application in the learning process contribute to a general improvement in learners' attitude to mobile learning (Cavus and Uzunboylyu, 2009). For example, students create a continuous link between place, time, and learning content through mobile devices connected to a wireless network, by their tasks. The portable feature of gadgets makes them a more attractive way to process information. Language learners can combine mobility and the real world by learning unfamiliar words using smartphone apps in transit or anywhere else (Cohen and Ezra, 2018). Thus, most research proves the effectiveness of mobile learning. It, in turn, affects the development of critical thinking skills in mobile learning.

In the 21st century, the major emphases in education are as follows: development of innovation and independent learning skills; critical thinking and problem-solving skills; skills of communication and

cooperation with other people; creativity; media and technical skills; technological (ICT) and information literacy; knowledge and skills that facilitate life and work (Franklin, 2011). Mobile learning can help with most of them. However, today in the context of globalization and digitalization, there is a problem of the quality of information on the Internet as it can be posted by anyone; not all online resources are reliable, valuable and accurate. For example, on social networks, all users can share posts, articles, etc. At the same time, the information may be inaccurate, and sometimes deliberately incorrect in order to mislead people or advertise some products or services. There is a problem with online information assessment skills and a lack of ability to use assessment criteria, including relevance, authority, accuracy and purpose (Parsazadeh, Ali and Rezaei, 2018). This leads to the use of low-quality information for various purposes, including education. Researchers offer the following tools that can help users determine the quality of information on the Internet: a) Performance Monitoring; b) Site Analyzer; c) Traffic Analyzer; d) Web Mining; e) User Feedback (Eppler and Muenzenmayer, 2002). In addition to these tools, the ability to think critically and evaluate independently is also required.

Some scientists have confirmed the development of critical thinking skills in mobile learning. The most popular strategy was a combination of educational technologies. Other strategies (situational learning, expert assessment and project-based learning) can also be applied (Ismail, Azizan and Gunasegaran, 2016).

Learning should (1) empower learners to reach their potential through access to educational resources and experts allowing them to transcend their schools or communities; (2) engage students in a rich and engaging learning experience that develops deeper knowledge and skills, in particular problem solving, creativity, and critical thinking skills that are required in the workplace; (3) provide students with the opportunity to take responsibility for their education and explore knowledge with unlimited curiosity thereby encouraging lifelong learning (Franklin, 2011).

Critical thinking involves the ability to be critical of any statement, not to believe information without evidence, and at the same time be open to new methods and ideas. It builds the foundations for the freedom of choice, responsibility for one's own decisions, and the reliability of forecasts (Hitchcock, 2020).

Critical thinking directly relates to cognitive skills. Critical thinking is seen as a self-regulating process that arises from the development of skills such as interpretation, analysis, assessment and explanation that go beyond technical skills. It can be considered a metacognitive process (Nussbaum et al., 2021).

In the process of mental activity, cognitive distortions are inevitable; these are errors caused by the very mechanism of thinking and the bounded rationality of people.

Various psychologists offer their own lists of cognitive distortions. Some of them are listed below:

1. All-or-nothing thinking (dichotomous thinking): all situations are either black or white.
2. Fortune telling (e.g. catastrophizing): the future is always negative, regardless of other less catastrophic possibilities.
3. Discounting the positive: attention to the negative aspects of the situation and discounting any positive elements.
4. Emotional Reasoning: Too much emphasis is placed on the emotions associated with the situation despite evidence to the contrary.
5. Labeling: the application of a fixed label to a person or situation despite evidence to the contrary.
6. Exaggeration or minimization: exaggeration of the negative aspects of a person or situation and minimization of the positive ones.
7. Selective abstraction (mental filter): attention to one detail of the stimulus at the expense of the whole.
8. Mind reading: believing that a person knows the thoughts of others.
9. Over-generalization: a false conclusion about a person or situation based on previous experience.
10. Personalization: misattribution of the words or actions of others to oneself.
11. Should-statements: assigning rules of behavior to oneself and other people.
12. Jumping to conclusions: erroneous conclusions without considering all aspects of the situation.
13. Blaming: blaming oneself or others for hardship or pain despite evidence to the contrary.
14. What if: negative hypotheses about the situation or the future.
15. Unfair Comparisons: comparing oneself to others in a disadvantageous way (Denton, Baliram and Cole, 2021).

It is necessary to note that the cognitive errors listed above are connected not with a concrete kind of activity, but with features of reception and interpretation of the information during communication with other people.

The development of technology and digital information along with a decrease in civic engagement and citizen confidence can lead to distorted presentation and acquisition of information (Addy, 2020).

The proliferation of fake news, traditional and digital media, as well as civic platforms have initiated departments, working groups and spaces to fact-check information posted on other media, spread on social media, or hailed by political leaders (López-García, Costa-Sánchez and Vizoso, 2021).

The main ways to check information from the Internet are a critical approach, search for the original data source and comparison of different sources, consideration of contrary viewpoints, learning to recognize fakes and check the accuracy of facts (for example, using Fakecheck.ru), etc. (Gorokhovskiy, 2017).

Several researchers have noted the relationship between cognitive errors and anxiety. Cognitive errors may be associated with anxiety in adolescents and lead to increased anxiety. Adolescents suffering from teen depression are more prone to cognitive errors of all types (e.g., catastrophizing, personalization, selective abstraction and overgeneralization) compared to their healthy peers (Rehna, Hanif and Tariq, 2012). Cognitive errors account for 78% of the deviations in anxiety among adolescents (Rehna, Hanif and Aqeel, 2020).

A similar thing can be observed in students, especially junior students, as well as in some adults (Salek Ebrahimi et al., 2019). It proves the need to make better the psychological state of children and adolescents in order to reduce rates of cognitive errors.

The process of critical thinking has its own stages and components. There is a classification of scientific knowledge (mathematics, physics), a general analytical framework is created, which includes basic information elements:

- Situational knowledge – initial assumption, parameter
- Conceptual knowledge – guiding principle, theory, concept
- Procedural knowledge – any (e.g. mathematical) manipulation or step-by-step computation to support a solution (Gong et al., 2016).

There is a problem with the relationship between critical thinking and emotion and intuition. The problem is exacerbated by the fact that there are circumstances of a multilingual and multicultural world. The main features of critical thinking are as follows: critical thinking is an exclusively independent process; information is only the beginning of the process of critical thinking, and not a finished product; meaningful argumentation is required; critical thinking is connected with society (everything is checked and improved when communicating with other people) (Hough, 2015; Sapukh, 2014).

Intuition enables one to quickly process multiple pieces of information without appreciable cognitive effort. Intuitive processes in judgment and decision making are responsible for integrating information and shaping response (e.g., preference, choice), where analytical thinking mainly guides the shaping of outcome, e.g., searching, summarizing, and changing information (Betsch and Glockner, 2010).

Critical thinking is one of the prerequisites for creativity. Creativity can be defined in a variety of ways, including by cognitive processes, personality traits, and environmental conditions, as well as the interaction of these components. Critical thinking can be viewed as a multidimensional cognitive construct that involves inductive and deductive reasoning, as well as creative processes that interact at different stages of problem-solving (Wechsler et al., 2018).

Today, creativity is an essential quality and various approaches are used for its development, for example, training, workshops, case studies. Thus, having completed training on creativity, people began to feel more creative, which led to higher confidence in their own creativity, as well as a desire to take more risks with their ideas (Perry and Karpova, 2017).

The literature review shows that mobile learning is popular today and has many benefits, including its positive impact on the development of critical thinking and cognitive skills in learners. Mobile learning does not provide a possibility to communicate with the teacher easily and thus makes students think themselves more. It also provides a large amount of visual information. While listening to the online lectures students can stop the video and review the necessary material. However, it also has a number of disadvantages, some of which will be analyzed in the study.

Setting objectives

Nowadays, the issue of studying various aspects of mobile learning is more relevant than ever before. It is rapidly being introduced into the educational process of pupils, students, and all other people who want to change their profession, improve their qualifications or learn something new. Despite a number of positive reviews, there is also an opinion that mobile learning can have a negative impact on students. The study aims to determine the effect of mobile learning on critical thinking and identify whether it develops critical thinking skills and whether there are ways to improve the situation. Since critical thinking is a universal quality of personality, the study of the possibilities of its development should be interdisciplinary in nature, so this study involved specialists in different areas - economics, physics, chemistry.

The purpose of the research is to study the impact of mobile learning on the development of critical thinking skills, identify cognitive errors in this process (if these occur) and offer recommendations for improving the situation.

The objectives of the study include examining the impact of mobile learning on the development of critical thinking skills; verification of information received from other sources; identifying possible methods for improving critical thinking and overcoming cognitive errors in the process of mobile learning.

Materials and Methods

Research design and sample

The research was based on interviews and tests. A similar research method was used by [El-Sofany and El-Haggar \(2020\)](#), [Ismail, Azizan and Gunasegaran \(2016\)](#), [Kurniati and Annizar \(2017\)](#). The study consisted of two parts.

Part 1: The students and teachers were invited to watch a short video on critical thinking (by IFO, <https://www.youtube.com/watch?v=MmlhUTvZj30>) in a classroom followed by a survey. The video talked about critical thinking, its definition, components, and principles (analysis, justification, assessment). Critical thinking film viewing and the study itself took place on May 2021.

The participants were provided with printed interview questions (9 in total), as some of them contained lists of answer options. Question 1 and question 9 were open-ended, the others (2-8) had answer options.

Part 1 (interview questions):

1. Can you define critical thinking?
2. What do you need critical thinking for? Answer options: "for the formation of an independent opinion", "for self-development", "for the development of communication skills", "for making non-standard decisions", "for finding the right solution", "for the development of scientific thinking", "not to be deceived", "not to succumb to propaganda", "for controlling emotions and intellect", "for the manifestation of one's own individuality", "for other reasons".
3. What's your attitude to mobile learning? Answer options: "positive", "negative", "contradictory", "neutral".
4. To what extent do you think mobile learning supports / does not contribute to the development of critical thinking? Answer options: "contributes", "does not contribute".
5. Do you think that the disciplines you study at university contribute to the development of critical thinking? (Answer options: "yes", "no").
6. Do you think that the subjects you studied in school contribute to the development of critical thinking? (Answer options: "yes", "no").
7. Which of the subjects listed do you think will develop critical thinking the most? (Answer options: "logic", "philosophy", "sociology", "history", "behavior in emergency conditions", "psychology", "political science", "public speaking", "project activities", "mathematics", "philology and native language", "the basics of neurolinguistic programming", "natural science", "religious studies", "economics", "sociology", "your alternative").
8. Do you think it is possible to effectively study the above subjects with the help of mobile learning? (Answer options: "yes", "no", "not sure").
9. Share your opinion on developing critical thinking in mobile learning.

Part 2 (examples of the test questions (20 questions in total)) ([Studmed, 2021](#)):

1. An insurance contract is a document required to conclude an insurance transaction (+ yes; no);
2. Is there a connection between the average life expectancy and the life insurance rate (+ yes; no)?;
3. Does the insurer know in advance the amount of life insurance policy pay out (+ always; depends on the terms of the policy; never)?;
4. Who has the obligation to prove the value of the loss (+ insured; expert; insurer)?;
5. Is it possible that the insurance sum is greater than the insured value under the contract (yes; + no)?;

Part 2. Students and faculty were required to take a short course in their major on a mobile device. Some participants took a course in economics and insurance (8 lessons, 30 minutes each) and took a test to assess their knowledge (20 questions / 15 minutes). The course was taught and developed by a teacher from Kazan Federal University. Part of research participants studied / taught economics; therefore, the

topic was the basics of insurance. The topics included an overview lecture, insurance contract, types of insurance, and insurance risks. Another part of the participants was studying natural sciences (chemistry, physics); for them an integrated course on conductivity of electrolyte solutions was offered, which also included an overview lecture, description of quantitative relationships, characterization of their constituent quantities, physical and chemical research methods. The course was taught by an instructor from Herzen University. Both courses were taught using Zoom software.

The materials and questions used in the study are our own development.

After watching a film with economic content (insurance) or natural science (electrical conductivity of electrolyte solutions) the participants took a short test. The test determined how well the learners perceived the information displayed on the mobile phone screen. There were no direct answers to the questions in the films, but they were clear from the information provided.

The result was described as positive when 70% of the test was correctly solved. Less than half of all the participants demonstrated such a result. Only 7 out of 20 questions received more than 70% of correct answers (8 by teachers and 5 by students).

Survey

The study involved 93 teachers (24-52 years old) and 182 students of various specialties (19-21 years old), a total of 275 people from Kazan Federal University (the Russian Federation), Moscow Aviation Institute (National Research University, the Russian Federation), Sechenov First Moscow State Medical University (the Russian Federation) and Herzen University (the Russian Federation).

Data analysis and statistical processing

The results of the interview were recorded, transcribed into a Word document, analyzed, and summarized. The test results were entered into an Excel spreadsheet and analyzed, including with the help of the SPSS program.

Ethical issues

The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The research was approved by the local ethics committees of Herzen University. Each research participant gave their written consent to participate in the study. The invitation leaflets that were previously distributed to the students contained complete research information.

Research limitations

The study can be considered reliable, but it should be noted that it was conducted at four universities of the Russian Federation, and the number of participants was limited. An identical study conducted in other countries may provide different results.

Results

Part 1

The answers to the interview questions are as follows:

1. Can you define critical thinking?

Five per cent of the interviewees noted that they could not answer the question. They were all students. The examples of teachers' answers: "the ability to assess the situation independently", "not to perceive everything in good faith", "to be able to give one's own assessment of the situation", "not to be affected by other people's ideas." The examples of students' answers: "the ability to critically perceive the information received or seen", "to question some facts", "to have one's own opinion about everything."

These results show that both the majority of students and teachers generally understand what critical thinking is. The answers are similar to those contained in the video. The research participants emphasize that critical thinking should protect them from the negative effect of information from the outside, imposed opinions and beliefs. The fact that 5% of students could not answer this question is most likely due to the fact that they were inattentive while watching the video, or the topic was not interesting to them. Therefore, there is a need to explain to university students the importance of acquiring critical thinking skills.

2. What do you need critical thinking for?

The question contained answer options and the students had to choose the most suitable one for them. Answer options: "for the formation of an independent opinion", "for self-development", "for the development of communication skills", "for making non-standard decisions", "for finding the right solution",

“for the development of scientific thinking”, “not to be deceived”, “not to succumb to propaganda”, “for controlling emotions and intellect”, “for the manifestation of one’s own individuality”, “for other reasons” (Zhukotskaya and Chernenkaya, 2019) (Figures 1 and 2).

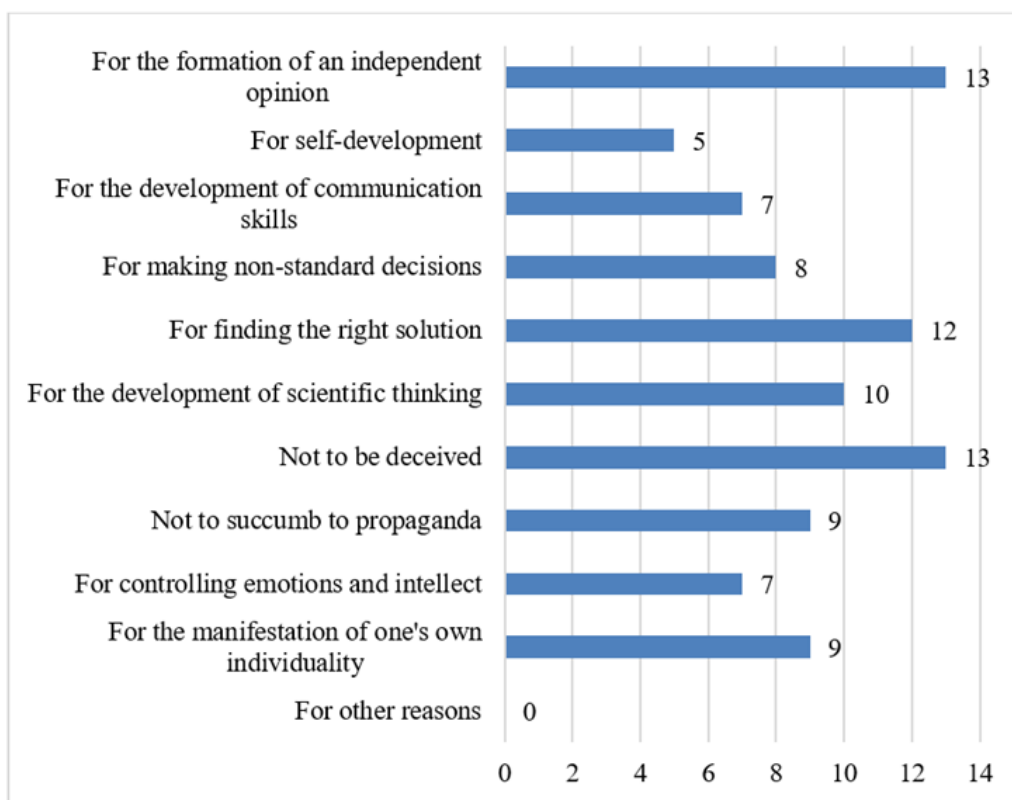


Figure 1. The answers to interview question 2 (teachers)

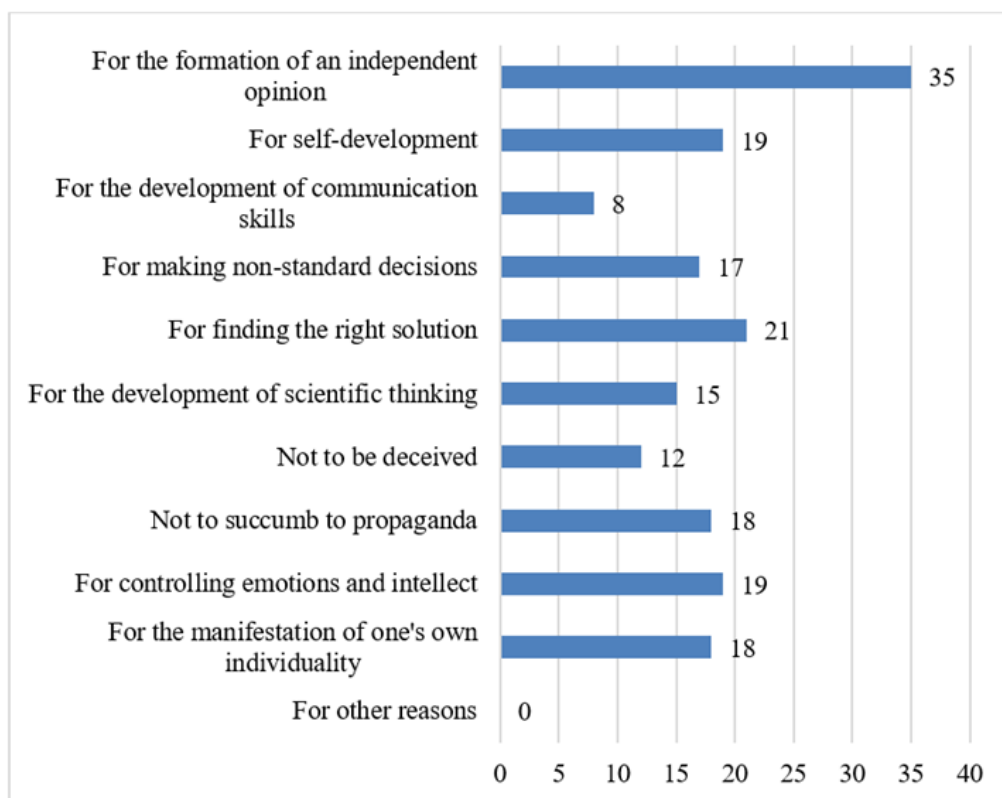


Figure 2. The answers to interview question 2 (students)

Teachers believe that critical thinking is needed to “form an independent opinion”, “not to be deceived” and “to find the right solution.” Among the students, the most popular answers were “to form an independent opinion”, “to find the right solution”, “for self-development” and “to control emotions and intellect”. The opinions of teachers and students were similar. Goals such as “to make non-standard decisions,” “to develop scientific thinking,” and “to manifest one’s own individuality” were generally found to be less popular among survey participants.

3. What’s your attitude to mobile learning?

Answer options: “positive” (28 teachers and 42 students), “negative” (36 teachers and 47 students), “contradictory” (29 teachers and 34 students), “neutral” (0 teachers and 59 students).

As noted above, today the attitude of people towards mobile learning is ambiguous. Only a minority of teachers and students have a positive opinion of it. Due to the fact that there is a need for a large-scale introduction of technologies in the field of education, it is possible to recommend that education authorities work on the opinion of the population and mobile learning, for example, by conducting training, equipping classrooms with innovative teaching tools, contributing to the exchange of experience, etc.

4. Does mobile learning contribute to critical thinking (or not)?

Answer options: “contributes” (39 teachers and 81 students), “does not contribute” (54 teachers and 101 students). As can be seen, the majority of respondents (58% and 55%) believe that mobile learning does not contribute to the development of critical thinking. This partially stems from the problems that were mentioned in question 3. As a solution to this issue, the development of high-quality educational applications for mobile devices can be recommended along with the improvement of technological skills, time management, etc.

5. Do you think that the disciplines you study at university contribute to the development of critical thinking? (“yes”, “no”).

Fifty-two teachers and eighty-three students answered positively while forty-one teachers and ninety-nine students answered negatively. Accordingly, teachers have a better opinion of university disciplines in the context of developing critical thinking compared to students. Based on these results, it can be concluded that many students are not interested in studying a number of university disciplines as they consider them impracticable. To improve the situation, it is necessary to make the method of presenting the material more interesting with an emphasis on the practical application of the knowledge gained.

6. Do you think that the disciplines you study at university contribute to the development of critical thinking? (“yes”, “no”).

Sixty-eight teachers and one hundred and one students answered this question in the affirmative. Twenty-five teachers and eighty-one students answered in the negative. Most teachers and students believe that school subjects contribute to the development of critical thinking. The results show that the respondents consider school subjects to be more useful. This is probably due to the peculiarities of teaching methods and tutorial work at school. Accordingly, the teaching methodology of some university disciplines should be revised.

7. Which of the following do you think will develop critical thinking the most?

A list of subjects was given but the participants could also come up with their own options: logic, philosophy, sociology, history, behavior in emergency conditions, psychology, political science, public speaking, project activities, mathematics, philology and native language, foreign philology, the basics of neurolinguistic programming, natural science, religious studies, economics, physics, chemistry, your alternative (Zhukotskaya and Chernenkaya, 2019) (Figures 3 and 4).

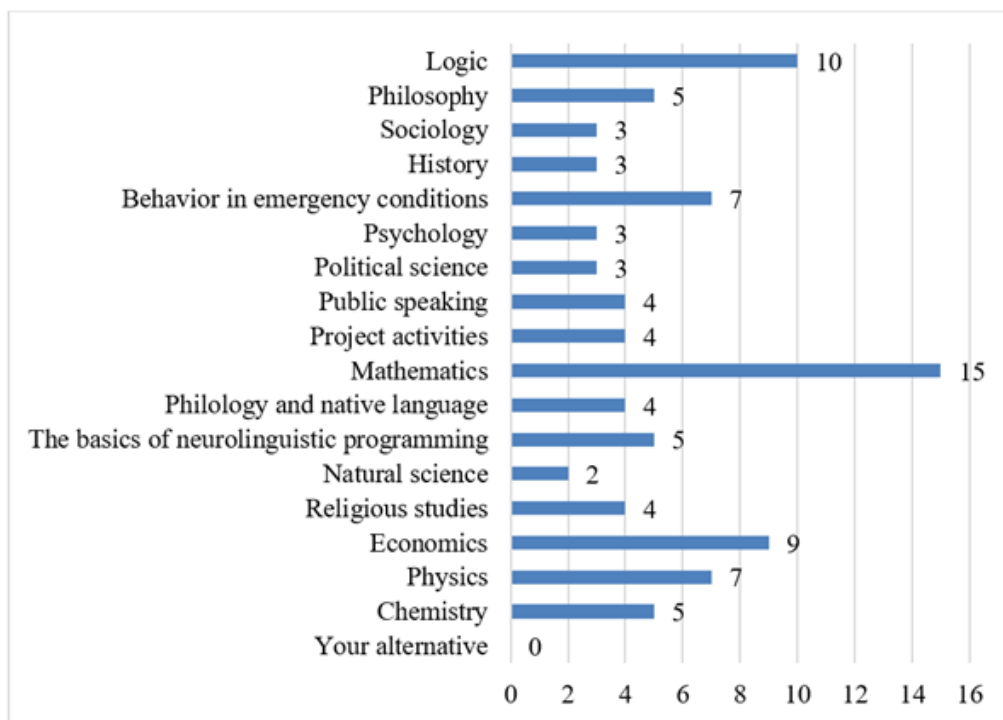


Figure 3. Teachers' answers to question 7

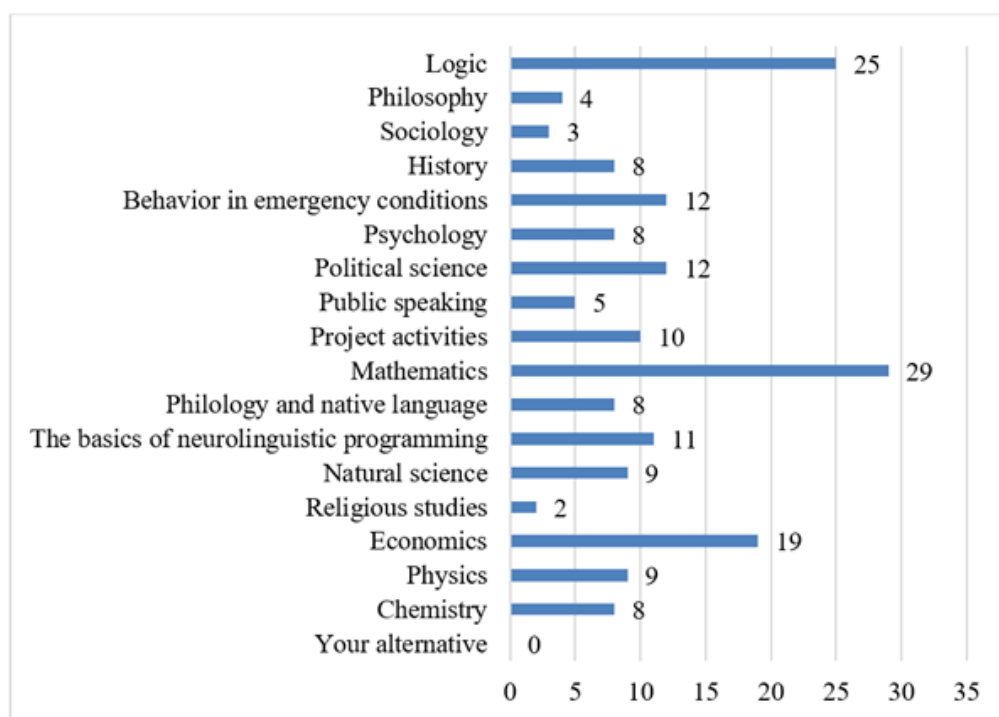


Figure 4. Students' answers to question 7

According to teachers and students, the subjects that develop critical thinking the most are mathematics, logic and economics. It is a common belief that these subjects contribute to the development of critical thinking. It is necessary to explain to students that other subjects (including humanitarian ones) are also important and improve critical thinking skills.

8. Is it possible to effectively study the above subjects with the help of mobile learning? ("yes", "no", "not sure").

Thirty-eight teachers and seventy-two students answered this question in the affirmative; forty-

six teachers and one hundred and two students answered in the negative. The “not sure” option was selected by 9 teachers and 8 students. Most teachers and students believe that these subjects cannot be effectively studied in the context of mobile learning. To solve this problem and increase motivation for mobile learning, we can recommend the development of interesting online courses, the active use of technology in the classroom, a combination of traditional and modern teaching methods. On this point, physicists and chemists are generally against mobile learning because they are experimental subjects, but learning theoretical material is acceptable in such cases as lockdown.

9. Share your opinion on developing critical thinking in mobile learning.

The teachers and students (optional) provided detailed answers to the question, for example:

Respondent 1 (teacher): “In my opinion, mobile learning does not provide an opportunity for live communication between teachers and students, which prevents the development of critical thinking.”

Respondent 2 (teacher): “Critical thinking can only develop if students are serious about mobile learning.”

Respondent 3 (teacher): “I think that in order for critical thinking to develop, it is necessary to combine traditional learning and mobile learning: 70% / 30%.”

Respondent 4 (student): “Mobile learning can promote the development of critical thinking provided that students treat it responsibly and the results are regularly monitored.”

Respondent 5 (student): “I think this type of education does not contribute to the development of critical thinking as it is similar to watching TV; there is no one to talk to or ask questions.”

Respondent 6 (student): “In my opinion, it does not contribute to the development of critical thinking and can only be used as an auxiliary type of education.”

The results show that the study participants have ambiguous opinions about the possibility of developing critical thinking skills. All respondents were from the Russian Federation, where the traditional approach to teaching prevails. To improve the attitude of teachers and students to mobile learning and its ability to develop critical thinking, it is necessary to popularize it among the participants in the educational process, introduce technologies into lesson plans, focus on the convenience of perceiving information from device screens, combine it with traditional learning, etc.

Part 2

Tables 1 and 2 show the results of teacher and student tests. The result is described as positive when 70% of the test was correctly solved.

Table 1

Teachers' test results, %

	Result	Teacher 30	34	Teacher 60	86
Teacher 1	58	Teacher 31	55	Teacher 61	49
Teacher 2	49	Teacher 32	69	Teacher 62	58
Teacher 3	58	Teacher 33	68	Teacher 63	67
Teacher 4	38	Teacher 34	72	Teacher 64	69
Teacher 5	94	Teacher 35	48	Teacher 65	69
Teacher 6	76	Teacher 36	59	Teacher 66	59
Teacher 7	52	Teacher 37	68	Teacher 67	66
Teacher 8	41	Teacher 38	85	Teacher 68	55
Teacher 9	99	Teacher 39	89	Teacher 69	87
Teacher 10	52	Teacher 40	97	Teacher 70	93
Teacher 11	46	Teacher 41	54	Teacher 71	99
Teacher 12	43	Teacher 42	72	Teacher 72	58
Teacher 13	42	Teacher 43	94	Teacher 73	61
Teacher 14	85	Teacher 44	55	Teacher 74	65
Teacher 15	87	Teacher 45	57	Teacher 75	68
Teacher 16	51	Teacher 46	68	Teacher 76	59
Teacher 17	55	Teacher 47	64	Teacher 77	45
Teacher 18	56	Teacher 48	61	Teacher 78	49
Teacher 19	84	Teacher 49	70	Teacher 79	59
Teacher 20	69	Teacher 50	75	Teacher 80	54
Teacher 21	67	Teacher 51	49	Teacher 81	65
Teacher 22	85	Teacher 52	68	Teacher 82	69
Teacher 23	69	Teacher 53	69	Teacher 83	68
Teacher 24	69	Teacher 54	59	Teacher 84	70
Teacher 25	59	Teacher 55	58	Teacher 85	72
Teacher 26	84	Teacher 56	97	Teacher 86	69
Teacher 27	56	Teacher 57	64	Teacher 87	49
Teacher 28	59	Teacher 58	71	Teacher 88	48
Teacher 29	68	Teacher 59	72	Teacher 89	59
				Teacher 90	58
				Teacher 91	97
				Teacher 92	69
				Teacher 93	73

Table 2
Students' test results, %

	Result	Student 46	95	Student 91	59	Student 136	58
Student 1	48	Student 47	28	Student 92	48	Student 137	24
Student 2	49	Student 48	37	Student 93	69	Student 138	35
Student 3	51	Student 49	56	Student 94	39	Student 139	75
Student 4	38	Student 50	49	Student 95	27	Student 140	15
Student 5	67	Student 51	28	Student 96	38	Student 141	95
Student 6	75	Student 52	67	Student 97	34	Student 142	68
Student 7	26	Student 53	68	Student 98	59	Student 143	73
Student 8	91	Student 54	69	Student 99	68	Student 144	54
Student 9	46	Student 55	54	Student 100	71	Student 145	58
Student 10	38	Student 56	37	Student 101	54	Student 146	69
Student 11	46	Student 57	29	Student 102	38	Student 147	57
Student 12	57	Student 58	24	Student 103	69	Student 148	48
Student 13	76	Student 59	58	Student 104	58	Student 149	24
Student 14	78	Student 60	79	Student 105	67	Student 150	38
Student 15	49	Student 61	45	Student 106	49	Student 151	59
Student 16	28	Student 62	43	Student 107	58	Student 152	64
Student 17	39	Student 63	68	Student 108	76	Student 153	57
Student 18	64	Student 64	61	Student 109	92	Student 154	28
Student 19	69	Student 65	38	Student 110	45	Student 155	49
Student 20	73	Student 66	39	Student 111	19	Student 156	56
Student 21	46	Student 67	49	Student 112	56	Student 157	37
Student 22	28	Student 68	57	Student 113	28	Student 158	68
Student 23	39	Student 69	67	Student 114	39	Student 159	57
Student 24	67	Student 70	59	Student 115	67	Student 160	49
Student 25	59	Student 71	54	Student 116	58	Student 161	28
Student 26	49	Student 72	37	Student 117	19	Student 162	79
Student 27	33	Student 73	39	Student 118	28	Student 163	94
Student 28	34	Student 74	68	Student 119	45	Student 164	81
Student 29	56	Student 75	57	Student 120	12	Student 165	56
Student 30	72	Student 76	69	Student 121	59	Student 166	49
Student 31	84	Student 77	69	Student 122	67	Student 167	58
Student 32	65	Student 78	64	Student 123	58	Student 168	27
Student 33	42	Student 79	58	Student 124	49	Student 169	49
Student 34	28	Student 80	37	Student 125	42	Student 170	18
Student 35	19	Student 81	39	Student 126	58	Student 171	59
Student 36	25	Student 82	34	Student 127	56	Student 172	46
Student 37	38	Student 83	29	Student 128	72	Student 173	58
Student 38	67	Student 84	68	Student 129	49	Student 174	67
Student 39	71	Student 85	58	Student 130	58	Student 175	91
Student 40	68	Student 86	67	Student 131	24	Student 176	80
Student 41	59	Student 87	79	Student 132	36	Student 177	49
Student 42	27	Student 88	84	Student 133	57	Student 178	37
Student 43	64	Student 89	28	Student 134	49	Student 179	58
Student 44	75	Student 90	64	Student 135	59	Student 180	69
Student 45	28					Student 181	49
						Student 182	90

The results show that a minority of teachers and students coped with the test. This indicates minor effectiveness of taking an online course. Probably, in order to improve the situation, it is necessary to make the course more interesting, concise, and visual, as well as to provide students with an opportunity to communicate with teachers and peers during the course. Interaction between people is required for the formation of ideas and opinions, as well as understanding of the material. There is also a problem with the perception of information due to the small screen, limited field of view, etc. Taking a short test after each session can also be recommended (for self-examination).

To test how significant or random the observed result is, the null hypothesis is put forward about the absence of statistically significant differences in the results of the knowledge test from the normal expected distribution.

The results of Pearson's chi-square fit test are presented in Table 3. For both students and teachers, statistics p-values are significantly less than the α of 0.05 (.0391 - for students and .0413 - for teachers). Based on the presented results, the null hypothesis about the absence of statistically significant differences in the results of the knowledge test from the normal expected distribution must be discarded. From this, we can conclude that the applied method of mobile learning can lead to statistically significant changes in the quality of learning in the subjects studied.

Table 3

The results of Pearson's chi-square fit test

Students			Teachers		
df	χ^2	p-value	df	χ^2	p-value
92	121.9	.0391	181	212.3	.0413

Discussion

Before the study, two hypotheses were developed: (1) mobile learning significantly contributes to the development of critical thinking; (2) cognitive distortions are often experienced by learners using mobile devices.

Based on the results of the first part of the study, both teachers and students have an ambiguous attitude to mobile learning and its impact on the development of critical thinking. Most teachers noted that critical thinking is needed not to succumb to propaganda. Least popular answers: "for the development of scientific thinking", "not to be deceived." Among students, the most popular answers included "to find the right solution" and "to manifest one's own individuality" while the least popular one was "for the development of scientific thinking". It can be concluded that teachers place an emphasis on independent thinking, and students focus on self-expression. According to both teachers and students, logic, mathematics, and economics have been defined as disciplines that contribute to the development of critical thinking. This indicates that most people believe that liberal arts and learning through mobile learning do not have a significant positive impact on the development of critical thinking. In addition, most respondents believe that all the subjects listed are difficult to learn through mobile learning. This is explained by the lack of experience in such a study and the ambiguous attitude towards mobile learning. Both students and teachers believe that school subjects are more conducive to the development of critical thinking than university ones. This is due to the peculiarities of teaching methods at school and a greater degree of control.

This study confirms hypothesis 2. Based on the analysis of the tests, it can be seen that most mistakes were made at the stage of reflection after the participants recalled and comprehended the material studied.

Scientists distinguish three stages of learning:

- recall (retrieval the information from memory, forming interest, setting the goals of studying the topic); contact with new information and its systematization;
- comprehension (realization of meaning): contact with new information and its systematization;
- thinking (reflection): consolidating new knowledge, rebuilding primary ideas.

The critical thinking development phases have the following functions:

- informational, motivational, communication (recall);
- systematizing, informational (comprehension of the content);
- informational, communication, evaluative, motivational (reflection) (Hitchcock, 2020).

The participants also made mistakes associated with information interpretation, analysis, evaluation

and explanation, which are also related to cognitive errors.

The situation is similar in Indonesia. The weaknesses of students in the context of solving mathematical problems are as follows: they cannot match information with the right concept; do not understand the concept associated with the task; do not present information in the form of tables, graphs or other symbols; have wrong assumptions; have the wrong plan that leads to the wrong strategy; do not check the end result; do not correct the wrong part; do not consider the application of different solutions. Students make the biggest number of mistakes during the reflection phase (Kurniati and Annizar, 2017).

The test results also showed that during online lectures it is quite difficult for students to highlight basic information or outline the most important points. They may pay more attention to less important information and less attention to important information.

In another study devoted to students' critical thinking skills that took place in Slovakia, the participants reported that during lectures they copy the information from the board / screen and that the teachers do not force them to take an active part in the process. Some teachers provide lecture texts (for example, in learning management systems (LMS)). Many students stated that this simplifies the learning process and that they can listen to the lecture more attentively without having to take notes. Some students responded that they have to use only texts to study some disciplines (Straková and Cimernanová, 2018).

There are also cases when participants rely on other sources to prepare for the test; these contain inaccurate information, which results in students' making mistakes. According to a study in Malaysia, information literacy refers to the ability to recognize when the information is needed, then find, evaluate, and use relevant information effectively (Parsazadeh, Ali and Rezaei, 2018).

The lectures gave the students fairly good knowledge of the topic but did not allow them to answer many specific questions. According to the participants, the reasons they failed to answer some test questions are the impossibility of asking the teacher questions and clarifying incomprehensible information, the difficulty of perceiving information from the screen of a smartphone / tablet.

Integrating smartphones into the learning environment is a challenging task. Teachers may need to incorporate smartphones into teaching and learning to create engaging teaching and optimal classroom interaction with students while reducing or at least minimizing distractions that can occur. Potential problems include distraction, addiction, lack of skills, and decreased quality of personal communication. Scholars from Brunei note that in order to avoid any inconvenience when using smartphones in the classroom, proper rules for the use of smartphones in the classroom must be established in advance and followed by students (Anshari et al., 2017).

The study participants also noted that they felt fear and uncertainty during the test. After taking the online course, they were not confident in their abilities and reported that this was associated with the lack of interlocutors and feedback. According to researchers from the Netherlands, one of the most common cognitive errors among adolescents is "underestimating the ability to cope", "personalization without mind-reading", "selective abstraction", "overgeneralization", "mind-reading", which contained a "threat-related conclusion." All cognitive distortions, except for "selective abstraction", correlate with anxiety. The most significant predictors of anxiety are "underestimating the ability to cope" and "mindreading" (Maric et al., 2011).

It should be noted that attitudes towards mobile learning, technology, and the level of technophobia differ in developed (for example, the USA, the Netherlands) and developing countries (for example, Indonesia, India). The main issue of developing countries is weak infrastructure, outdated equipment or its lack. Average Internet prices there are three times higher than in developed countries, and prices for mobile Internet are twice as expensive. In addition, a large part of the population uses devices that are only compatible with the 2G network, which does not allow them to comfortably enjoy all the features of mobile learning (Bukht and Heeks, 2018; Greenhow and Askari, 2017).

According to Cahyana et al. (2018), the indicators of critical thinking are focusing on the issue, taking into account the reliability of the source, observing and recording observation reports, conducting inductive reasoning and considering the results of it, defining a term and considering a definition, deciding on an action. Based on the test and interview results, the participants had difficulty in induction, deduction, and final decision-making.

In order to overcome distortions associated with the lack of critical thinking skills, it is necessary, first of all, to understand the difference between everyday and critical thinking (Figure 5):

Everyday thinking	Critical thinking
Belief in available information	Understanding that data can be interpreted differently
Grouping of concepts based on associations	Awareness of mechanisms and principles
Assumptions based on little evidence	Creation of hypothesis
Random sorting of events and facts	Justified sorting of events and facts
Use of intuition	Reasoned point of view
Unjustified preference	Considered opinion
No consideration of criteria	Consideration of criteria
Spontaneous conclusions	Logical conclusions

Figure 5. Comparison of everyday and critical thinking
Source: Developing students' critical thinking in pedagogy classes (VSEPU, 2009).

In order to be able to use critical thinking, the student must develop a number of qualities. Here the work of a teacher is also important, who not only directs his/her pedagogical actions to ensure that students learn a discipline, but also organizes work on the development of such qualities in them:

1. Ability to plan and arrange thoughts.
2. Be flexible and listen to other people's ideas.
3. Perseverance.
4. Ability to correct mistakes.
5. Awareness.
6. Ability to find compromise solutions (VSEPU, 2009).

This approach is also applicable in the context of mobile learning, which requires critical thinking skills, first of all, to check the quality of information and the reliability of facts.

Cognitive distortions related to information interpretation, analysis, and evaluation, as well as the development and explanation can be fixed based on the following guidelines (Table 4).

Table 4
Recommendations for fixing cognitive distortions

1	Information interpretation	When the information listened to or read is not clear, it should be read several times. It is also necessary to consider practical examples on the topic and try to connect them with the theory.
2	Analysis	It is necessary to try to structure the information, for example, to depict it in the form of a diagram (cluster), try to understand the system, logic, and chronology.
3	Evaluation	In the context of mobile learning, it is necessary to be able to assess the quality of information. In addition to taking a critical look at the information, the reliability of the source and the authority of the author should be checked. You can also find other sources with similar information, compare several sources, etc.
4	Explanation	After viewing, listening, or reading the information, it should be retold or briefly summarized.

To improve critical thinking skills, the following action plan was developed (Table 5).

Table 5
Recommendations for improving critical thinking skills

1	Development of skills to control one's own thoughts	The student must learn to sort, plan and control their thoughts, not to let them go by chance; and demonstrate mindful behavior
2	Learning to communicate with other people	The right ideas are always born and refined when interacting with other people. A person should be open to other people's thoughts and opinions.
3	Persistence	Good skills cannot be mastered quickly. It is a persistent approach that provides an opportunity to achieve success.
4	Error analysis session	The student should be able to find, understand, admit and correct their mistakes, and not be afraid of this.
5	Search for compromises	It should be recognized that there are no completely correct and completely wrong ideas and situations. Each phenomenon must be considered from different angles before making a decision.

The results of the study are interpreted within the framework of pedagogy and psychology and are a good contribution to the study of modern methods and approaches in education.

Conclusions

Due to the fact that mobile learning is gaining popularity, there is a need to explore its positive and negative aspects. One of these aspects is its effect on the development of students' critical thinking skills. The results of the study showed that the attitude towards mobile learning is ambiguous today; among teachers and students there are advocates and opponents of mobile learning. Most respondents believe that mobile learning has both positive and negative aspects and that its use in the learning process should be dosed. Today, only a small number of people completely deny it. The approximate percentage of study time that should be devoted to mobile learning, according to survey participants, is 10-30%.

In the process of mobile learning and assessment of its results, students (and sometimes teachers) can experience a number of cognitive distortions. The distortions can occur during the phases of comprehension and reflection, as well as in the course of information interpretation, analysis, evaluation, and explanation, which also complicates the effectiveness of fact-checking. There are many reasons for these distortions, including the lack of direct contact with the teacher, the inability to ask questions and discuss the topic, the poor quality of information, etc. Critical thinking skills can greatly help students avoid distortions.

To eliminate or minimize the problem of poor-quality information, as well as to improve fact-checking skills, students should use a number of tools, such as checking the credibility of the source and authors, interviewing the opposite party, and evaluating information, as well as automatic verification tools.

To improve critical thinking skills, an action plan that includes the following phases: development of skills to control one's own thoughts, learning to communicate with other people, perseverance, error analysis session, and search for compromises, was developed. These skills can also be developed in the context of mobile learning or its partial application.

This study does not contradict the data obtained by most other authors. It contributes to the study of different aspects of mobile learning, its capabilities, advantages and disadvantages. The results of the study may be of interest to teachers, students, academic administration, parents, as well as to those who are interested in modern pedagogy and educational psychology.

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Conflict of interests

The author declares no conflict of interest.

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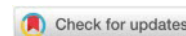
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Attitudes of Teachers to Using Information and Communication Technology in Teaching – Advantages and Obstacles

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Abstract: This paper analyses the attitudes of teachers to using information and communication technology in teaching. The study was conducted on a sample of 269 teachers in the Republic of Serbia. The purpose of this research is to look at the intensity of ICT use in teaching, as well as to identify the benefits and obstacles that teachers face when using this technology. The study was based on a descriptive research methodology. Surveying and scaling techniques were used to measure the attitudes of teachers. It was concluded that teachers often use ICT in teaching. The greatest advantage of ICT use, as seen by teachers, is improved quality of teaching, a possibility to deliver interesting lessons and quick and easy access to information. The greatest obstacles emphasized by teachers were underdeveloped competencies of teachers, limited access to ICT in schools and insufficient trust in the use of new technologies.

Keywords: *ICT in teaching, advantages of ICT in teaching, obstacles of ICT in teaching, innovation, modern teaching.*

Introduction

A fundamental characteristic of modern society is informatization of all segments of human life and work. It is essential to consider the significance of informatizing the school as a whole whereby both teachers and students should adopt fundamental attitudes towards the role information science plays in modern society and master the use of information technology in the coverage of both technical and general learning content. Information and communication technology is the most significant innovation for the improvement of teaching in schools. The integration of ICT into teaching has many advantages over traditional teaching. However, this is by no means a simple process that depends on numerous factors and hence encounters many obstacles.

There is a great number of studies dealing with advantages and obstacles to integrating ICT into teaching. The major advantages of using ICT (Ramboll, 2006; Balanskat and Blamire 2007; Vard and Parr, 2010; Džigurski et al., 2013; Braš Roth, Markočić-Dekanić and Ružić, 2014; Andevski, Vidaković and Arsenijević, 2014; Linberg, Olofsson and Fransson, 2016; Scherer and Hatlevik, 2017; Agrawal and Mittal, 2018; Al-Ansi, Garad and Al-Ansi, 2021; Thaheem et al., 2021; Nurliani, Sinaga and Rusdiana, 2021) include the fact that ICT has an overall positive impact on teaching and learning; it provides quick access to information and is a simple way to exchange information, communicate with other teachers, students and parents by e-mail; it offers flexibility in terms of time and space, the use of search engines to access new and relevant information, assistance with spelling; improves the quality of teaching, has strong motivational effects, enhances concentration and attention of students in class, has a positive impact on behaviour, communication skills and thinking, academic achievements in school, and provides a greater degree of curriculum differentiation designed according to students' individual needs.

Most studies single out the following most common obstacles (Ramboll Management, 2004; Empirica, 2006; Machin, McNally and Silva, 2006; Balanskat and Blamire 2007; Vard and Parr, 2010; Vastiau et al., 2013; Sipila, 2014; Vrasidas, 2015; Villalba, González-Rivera and Díaz-Pulido, 2017; Bhatti et al., 2021; Nurliani, Sinaga and Rusdiana, 2021; Tsegay et al., 2022) underdeveloped competencies of teachers, poor quality ICT equipment, low motivation, insufficient trust in the use of new technologies,

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limited access to ICT in schools, low level of information about the possibilities of ICT use, teacher's inclination to traditional teaching.

Information technology – new reality in teaching

Information science brings along structural changes to the society, communication and in the way individuals think and behave. The position an individual will have in social relations and ultimately his financial status will significantly depend on his knowledge, particularly his information knowledge. Those who can quickly adjust to constant changes where information competence plays an important part will do best in social environment. 'The main drive for the development of information society (Molnár, 2014, p. 421) is computer technology and quick growth in telecommunications'.

Informatization of teaching through introduction of powerful information technology allows for fundamental changes in the traditional concept and creating conditions where each student is his own master, able to manage his own work and achievements and progress according to his own abilities. Transition from traditional to modern information technology is very complex and highly demanding. According to Mandić, D. (2009), this involves changes in methods, form and the organization of the teaching process. With its various possibilities, innovative information technology constitutes an extraordinary modelling tool used not only for shaping quality and efficient teaching, but also for all school activities involving responsible and challenging tasks in a learning society. It ingresses the field of education content, teachers' activity, teaching forms and methods, learning styles, assessment, and the entire operation of school.

Informatization of education includes: a) universal information technology (redacted texts, graphic packs, database management systems, electronic tables, modelling systems, expert systems); b) computer telecommunication devices; c) computer teaching and controlling programs, digital textbooks; d) multimedia products. Informatization treats students as the focal point in the education process. Informatization of the education process is an interesting and appealing concept for the students as it reduces psychological strain since the subjective relationship between a teacher and a students is replaced by a relationship student - computer - teacher; it increases the efficiency of work, stimulates creativity and allows for the knowledge gained at school to be extended at home. Informatization is appealing for teachers as it enables them to improve the resultative aspect of their work. Informatization of the education process places the personality of a student in the centre of the teaching activity by providing favourable and comfortable environment for learning and the development of natural potential. In such conditions, a student is not just a subject but a priority subject, an objective of the education system.

The paper is structured as follows: Section 1 presents introduction, Section 2 presents the materials and methods used in the preparation of the paper. In this section we set the main and auxiliary hypotheses, the nature and type of the sample and statistical test and the parameters used. Section 3 reveals the preliminary results of our research. Discussions of our research was presented in Section 4. Conclusions are drawn in Section 5.

Materials and Methods

The subject of this study is to analyse current situation regarding the implementation of ICT in teaching. The aim of the present study is to establish the attitudes and the opinions of respondents regarding the degree of ICT use in the classroom and determine the advantages offered by ICT and obstacles teachers encounter in the implementation of ICT in the teaching process. The tasks of this study are to: 1. determine the level at which ICT is used in the teaching process by teachers; 2. identify the advantages offered by the implementation of ICT in the classroom; 3. identify the obstacles teachers encounter when using ICT in the classroom.

Hypothesis 1. Respondents use ICT in teaching to a high degree.

Hypothesis 2. It is assumed that the implementation of ICT in the teaching process allows teachers to deliver more interesting lessons and improve the quality of teaching.

Hypothesis 3. It is assumed that teachers in the course of their educational work do not come across obstacles in using ICT in education.

For the purpose of this paper, a descriptive research method was used. To measure the degree of ICT use, teachers were provided with a five-point scale. Data on advantages and obstacles to using ICT in teaching were collected by designing a Likert-type scale with the list of ten statements related to the advantages of ICT implementation in the classroom and the list of nine statements regarding the obstacles to ICT use in teaching.

The study was conducted in the period from January to March 2022. The basic cohort of this study comprised 269 teachers from primary schools in the Republic of Serbia. The sample was that of a stratified simple random nature.

Statistical tests and parameters

The data were analyzed with the SPSS statistical package (IBM SPS Statistics Version 20). The study was based on a descriptive research methodology. Surveying and scaling techniques were used to measure the attitudes of teachers. All values skewness are a negative sign that indicates that most respondents achieved more than an arithmetic mean. This also shows the values of kurtosis. As a measure of vertical deviation from the normal distribution, in this case, it is found that the respondents mostly agree with each other that Clarity, Suitability and Innovation of Contents ($Ku = 6,76$) the real characteristic of effective teaching. Ultimately, the Kolmogorov-Smyrna test values were applied to check that the normal distribution of scores is or our split scores deviate from the normal ones. All obtained values are statistically significant at the level of 0.01 which indicates that the distribution does not deviate from normal distribution.

Two characteristics according to which the respondents have a different opinion, such as: Students do all their activities, including homework, at school ($M = 3,09$). Very high arithmetic mean ($M = 47,71$), high value of fashion as the most common individual result ($Mod = 48,00$), negative skewness ($Sk = 0,68$) and χ^2 square ($\chi^2 = 2,87$) which is statistically significant at the level of 0.01 only further confirm the previous findings. All arithmetic values exceed 4.00 in the range of 1-5. For every 16 features of the effective school, the arithmetic values are 3.00 and they are close to $M - 4,00$ and slightly exceed this mean ($M - 4,00$) and approach the optimal values in the range of 1-5 scale.

Results

Attitudes of teachers regarding the degree of ICT use in teaching

To measure the degree of ICT use, teachers were provided with a five-point scale. Teachers answered separate questions on how often they use ICT in the classroom as per the following scale: I never use ICT in teaching, I rarely use ICT in teaching, I use ICT in teaching to an average extent, I often use ICT in teaching, I always use ICT in teaching. The obtained results are shown in Table 1.

Table 1
Intensity of attitudes regarding ICT use in teaching

Degree of use	Scale value	no.	%
I never use ICT in teaching	up to 1.5	0	0.00
I rarely use ICT in teaching	from 1.6 to 2.5	15	5.10
I use ICT in teaching to an average extent	from 2.6 to 3.5	51	22.46
I often use ICT in teaching	from 3.6 to 4.5	129	43.88
I always use ICT in teaching	from 4.6 to 5.0	74	28.57

Attitudes of teachers regarding the advantages of ICT use in teaching

Table 2 shows the list of advantages the use of ICT in the classroom offers. It can be seen that mean scores for each statement were moved towards the higher end of the 1 to 5 scale. All the mean values are far closer to the top end (5) than the bottom value (1).

Table 2
Advantages of ICT use in the teaching

Statements	M	SD	Sk	Ku	t	p	χ^2
Improving the quality of teaching	4.15	3.03	-8.79	82.72	0.48	0.63	199.42
Possibility to deliver more interesting lessons	4.05	0.89	-0.53	-0.65	-0.99	0.33	53.92
Quick and easy access to information	4.04	0.83	-0.49	-0.43	1.61	0.11	67.07
With the use of ICT, teaching contents are more accessible and of better quality	3.99	0.91	-0.55	-0.46	-1.26	0.21	50.51
Flexibility in time and space	3.95	0.89	-0.39	-0.58	-2.00	0.05	47.93
Enhancing students' motivation	3.91	1.04	-0.79	-0.10	-1.45	0.15	91.80
Easy way to exchange information	3.91	0.80	-0.32	-0.43	-1.98	0.05	74.47
Improving concentration and attention in class	3.88	0.94	-0.99	0.81	-1.74	0.08	161.40
Exchanging experience with other teachers	3.74	0.97	-0.20	-0.98	-1.77	0.08	22.88
Simpler correlation between teaching content	3.70	0.88	-0.36	-0.51	-3.09	0.00	59.52

Attitudes regarding the obstacles to ICT use in teaching

Table 3 shows the attitudes of teachers regarding the obstacles they come across in teaching when using ICT. In this table, like in the one above, the mean score values were moved toward the higher end of the 1 to 5 scale for each statement. All the mean values are far closer to the top end (5) than the bottom value (1). The results indicate that all the deviations of the χ^2 test are statistically significant at the level of 0.01. Such interpretation is backed up by negative and minimum skewness values.

Table 3
Obstacles to using ICT in teaching

Statements	M	SD	Sk	Ku	t	p	χ^2
Underdeveloped teachers' competencies	4.04	0.81	-0.43	-0.48	-0.21	0.84	72.46
Limited access to ICT in schools	3.91	0.82	-0.50	-0.13	0.79	0.43	82.00
Insufficient trust in the use of new technologies	3.91	0.82	-0.07	-1.00	-2.72	0.01	61.10
Lack of adequate technical conditions	3.90	0.78	-0.21	-0.54	1.06	0.29	78.33
Technological complexity	3.88	0.83	-0.40	-0.35	-2.14	0.03	68.91
Insufficient time	3.81	0.89	-0.31	-0.67	-0.93	0.36	44.08
Inadequate knowledge of English	3.76	0.85	-0.55	0.52	-3.13	0.00	228.75
Low motivation	3.75	0.92	-0.43	-0.21	-2.61	0.01	103.23
Teachers' inclination to traditional teaching	3.60	0.91	-0.51	-0.22	-3.55	0.00	131.88

Discussion

The purpose of this study was to establish the attitudes and the opinions of respondents regarding the degree of ICT use in the classroom and determine the advantages offered by ICT and obstacles teachers encounter in the implementation of ICT in the teaching process.

In Table 1 we see the analysis of the results distributed in such a way shows that teachers most often rate the use of ICT as above-average, i.e. very good or excellent, as reported by most teachers, which confirms the hypothesis assuming the respondents use ICT in the classroom to a high degree.

It can be seen that 43.88% of teachers reported “they often use ICT in teaching”, 28,57% of teachers reported always using ICT in teaching (Balanskat and Blamire, 2007; Ramboll Management, 2004; Vard and Parr, 2010; Džigurski et al., 2013; Braš Roth, Markočić-Dekanić and Ružić, 2014; Stošić and Stošić, 2015). The implementation of ICT in education is necessary for modern establishment. Traditional forms of teaching that do not use ICT are not interesting to students. Teachers find it difficult to match students. A contemporary sequel that focuses on active student learning with the use of modern technology offers countless opportunities for learning and increasing student motivation.

Only 22.46% of teachers reported they used ICT in teaching to an average extent, whereas 5.10% of teachers reported they hardly ever used ICT in teaching. On the other hand, the obtained results show that not a single teacher rated the degree of ICT use as “I never use ICT in teaching”. The obtained results demonstrate that general attitudes of teachers towards the use of ICT in the classroom are not distributed per normal distribution, but vary significantly, as it is evident that there is a much higher number of teachers with positive attitudes than those with undecided or negative attitudes.

From Table 2 it can be seen that the use of ICT in the classroom contributes to the improved teaching quality (Scherer and Hatlevik, 2017) for most with $M=4.15$. Provides the possibility to deliver more interesting lessons and offers quick and easy access to information with $M=4.05$ and $M=4.04$ respectively, as perceived by teachers and confirmed by the study conducted by (Džigurski et al., 2013; Al-Ansi et al., 2021; Thaheem et al., 2021), who highlighted as key advantages of ICT use the delivery of higher quality lessons and quick access to information. This confirms the hypothesis that the implementation of ICT in the teaching process allows teachers to deliver more interesting lessons and improve the quality of teaching.

Respondents agree that the transformation of traditional school environment is irreversible and that the teaching concept hitherto based on textbooks and workbooks is no longer sufficient to attract and keep the attention of generations of students growing up in a multimedia environment. Therefore, teachers using ICT testify from experience that lessons delivered in this way result in a better focus of students on the material, encourage creativity, engage and develop an inquisitive mind. Furthermore, if used to its full potential, in an illustrative and interactive way, technology achieves a closer humane relationship between a teacher and a student (Džigurski et al., 2013, p. 47). In the last place on the list of advantages of the use of ICT in the classroom teachers put the exchange of experience with other teachers with $M=3.74$ and a simpler correlation between teaching materials with $M=3.70$. Materials they create themselves in electronic form and share online become more visible and contribute to both exchanging experiences with other teachers and a better positioning of teachers in a wider professional community. Additional motivation with the students causes when they prepare their own presentations because they care to do it well and get more praise on the analysis of the done.

In Table 3 we see the what most teachers $M=4.04$ see as the obstacle to successful use of ICT are underdeveloped competencies in teachers for the use of ICT in the classroom, as confirmed by other studies (Ramboll Management, 2004; Balanskat and Blamire, 2007; Džigurski et al., 2013; Sipilä, 2014; Lindberg, Olofsson and Fransson, 2016; Agrawal and Mittal, 2018). ‘Methodological training of teachers on the use of ICT in the classroom is of utmost importance’ (Stamoulis and Plakitsi, 2009, p.349). In Europe, depending on the country and the school type, there are different levels of teacher competence for the use of ICT in the classroom. In primary schools a significantly lower competence level was established with only 30% in possession of necessary skills, as opposed to 46% and 47% in secondary and vocational schools (Korte and Hüsing, 2006). The use of ICT in education is of key importance when it comes to modernizing the teaching process that involves more efficient, economical and effective teaching. For some teachers insufficient time is the problem (Legrain et al., 2015; Villalba, González-Rivera and Díaz-Pulido, 2017). ICT-assisted delivery of lessons requires a lot more time to find appropriate digital resources for teaching and learning.

Research shows that despite increased access to information and communication technologies, their potential advantages for learning and their ability to enhance or transform teaching and learning, teachers rarely use computers in the classroom, and if they do, they mostly use them at a basic (traditional) level

(Wachira and Keengwe, 2011; Barak, 2014). According to Kadjevich, the main reason for this should be sought in the fact that teachers lack sophisticated knowledge to support efficient integration of information and communication technologies (acc. to Milutinovic, 2016).

Insufficient trust in the use of new technologies (Hixon and So, 2009; Almekhlafi and Almeqdadi, 2010) with $M = 3.90$, it is caused by fear of mastering these technologies, given the high digital competence of the students themselves.

Limited access to ICT in schools, lack of adequate technical conditions and technological complexity found their place in the next group of obstacles and in the research that has been conducted (Machin, McNally and Silva, 2006; Balanskat and Blamire, 2007; Wastiau et al. 2013; Vrasidas, 2015) with $M=3.91$ and $M=3.88$, respectively. Teachers encounter difficulties and make a lot of effort (Linberg, Olofsson and Fransson, 2016) in the attempt to keep up with technological developments while keeping pace with the demands posed by teaching and students. Teachers do not feel confident about using the methodologies they have not mastered themselves. Moreover, most teachers lack knowledge of the English language, and computer programmes are poorly translated into Serbian or come with inadequate explanations. In addition, there are not enough appropriate training programmes that deal with practical use of technology in the teaching of certain subjects. Recent studies focusing on adopting ICT in education found that technological complexity has a significant direct impact on the attitudes regarding the use of computers (Teo, Milutinović and Zhou, 2016). A lack of motivation (Lane and Lyle, 2011) is mainly caused by the lack of continuous technical and methodological-didactic support in schools necessary for the adequate application of ICT in teaching. The lack of motivation is more noticeable with older teaching staff. Younger teaching staff, because of the much greater use of ICT outside of school, are also more motivated to teach using new technologies.

Respondents put Teachers' Inclination to Traditional Teaching in the last place on the list of obstacles with $M=3.60$. Things that are familiar and safe come much easier as does the sticking to the traditional way of teaching, which is simpler than embracing the challenge posed by the use of ICT in teaching. The hypothesis assuming that teachers encounter obstacles in the course of education when using ICT in the classroom was not confirmed as the list of obstacles faced by teachers during ICT use was identified.

The first research conducted online that included 27 countries was the research on the ICT use in the classroom carried out by the European Commission (2013) called "Survey of Schools: ICT in Education, Benchmarking access, use and attitudes to technology in Europe's schools", in the academic year of 2011/2012. Results indicate that teachers are not sufficiently informed about all the possibilities of ICT use in education, and hence they do not wish to engage in using something they are not familiar with.

Conclusion

Positive outcomes of informatizing the teaching process should result in intellectual efforts, the development of logical, prediction and operational thinking; specialization of cognitive processes; formation of specialized content motivation appropriate for computers in order to solve student's tasks; increased trust in computerized world; individualized teaching.

With this research, we wanted to point out the attitudes and the opinions of respondents regarding the degree of ICT use in the classroom and determine the advantages offered by ICT and obstacles teachers encounter in the implementation of ICT in the teaching process. establish the attitudes and the opinions of respondents regarding the degree of ICT use in the classroom and determine the advantages offered by ICT and obstacles teachers encounter in the implementation of ICT in the teaching process. When making recommendations, we started from the assumption underdeveloped competencies of teachers, limited access to ICT in schools and insufficient trust in the use of new technologies.

Gaining information professional competencies by future teachers will depend mostly on information literacy that they should have acquired in the course of their secondary education. Therefore, it is necessary to include information technology in the education content as much as possible. Education based on such technologies expands the area of cognitive tasks, allows for the transition to systematic management of the teaching activity, changes its structure and dynamics. In order to achieve this, operational and technical aspects of education need to be rearranged, spatial and time limits of their mutual action changed, and a self-regulation system created for working with information technology.

The contribution of this work is to point out the advantages and obstacles of using ICT in teaching as well as the possibility of their application or modification. Research can be the basis for further improvement of this topic "ICT needs to be integrated into education" (Hu et al., 2018).

This study provides educational policy makers looking at ICT integration in education with several

implications. Teachers' responses provide researchers with an account of the gaps that must be addressed in the implementation of ICT in education and the main drivers for the application of this technology in teaching. To increase the intensity of ICT use, it is necessary for teachers to: 1. Provide seminars and workshops for teachers to acquire digital competencies. 2. Provide better technical support and equipment in schools. 3. Intensify the use of ICT in teaching more intensively. 3. Form teams to advance the role of ICT at school level. 4. Introduce the obligation to train teachers for using ICT.

One of the limitations in this research is the school equipment, which is very different and varies with the profile and size of the school, the level of economic development of the municipality in which it is located. It is necessary, on a planned and on the basis of needs analysis, to invest in the provision of equipment (The National Education Council, 2013, p.105). In addition, most teachers lack English language skills, and computer programs in Serbian have poor translation and poor explanations. Also, there are not enough adequate trainings dealing with the practical application of technology in teaching specific subjects.

The acquisition of knowledge and skills in the ICT area is one of the preconditions for social involvement in the modern society. ICT needs to be integrated into the educational system in order to achieve good quality education for everyone. Previous practical experiences, pedagogical and especially psychological results, show that, apart from wider and narrower social factors, characteristics of teachers significantly influence the introduction of ICT in schools. Namely, there is no doubt that the teachers' attitudes and opinions, as a very important characteristic of each one of them, more or less have an effect on their behavior at school and readiness to make an effort to introduce ICT and modernize the teaching process. Therefore, teachers' attitudes on the introduction of ICT in teaching is a very important question because it significantly influences the efficiency of the work at school.

Conflict of interest

Authors declare no conflict of interest

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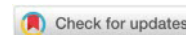
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Digital Competencies in the Context of Preschool Music Education

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Abstract: Given the digitalization of modern society and the way a child acquires musical experiences, practitioners are expected to apply various media in everyday educational praxis. The theoretical framework of technological pedagogical content knowledge (TPACK) is an approach that connects the knowledge of educators with Information and Communications Technology (ICT), concurrently developing technology-supported pedagogical knowledge and integration of technology into education. The paper aims to investigate educators' self-assessment of their digital competencies and their implementation in musical activities with preschool children. The respondents are full-time and part-time graduate students of the Early Childhood and Preschool Education study program from faculties of teacher education in Croatia. The obtained results indicate that 91,1 % of respondents didn't have any formal ICT education while 59,5 % didn't have any additional type of music education except during their studies. Nevertheless, the greatest knowledge participants have shown on the competencies for using digital tools (CFUDT) scale succeeded by a technological knowledge (TK) scale of the adapted TPACK-TCCMA survey, thus the respondents rated their digital and ICT competencies exceedingly high unlike music and pedagogical competencies. Considering the results obtained, it can be concluded that additional attention should be given to the development of digital, music, and pedagogical competencies during studies that will be applicable in both music and other areas of education.

Keywords: digital competencies, music preschool education, Information and Communications Technology (ICT), Technological pedagogical content knowledge (TPACK).

Introduction

Due to the contemporary way of life in which modern technology is increasingly prevalent, children from an early age are surrounded by various forms of digital media used independently or with the help of adults (Chaudron, 2015; Common Sense Media, 2017; Ofcom, 2017; Mantilla and Edwards, 2019). Although there are numerous criticisms of their overrepresentation in the lives of children at the expense of free play, it is necessary to accept the new changes and integrate technology into all areas of child-rearing. Several research suggest, for example, that well-designed computer programs facilitate and contribute to the understanding and acquisition of knowledge and child development (Hsu, Tsai and Liang, 2011; Panagiotakou and Pange, 2010; McKinnon, 2005; Ralph and Petrina, 2018; Bullock et al., 2017; Herodotou, 2018). Therefore, given the way new generations grow up, in convergency to the content, children need to be provided with various forms of digital animation in the acquisition of knowledge and skills (Liang et al., 2013). Technology, consequently, needs to be integrated into all areas of a child's upbringing and education, including the context of music education.

As a result of the development of modern technology, the availability of music is immensely represented in everyday life by comparison to previous generations. Nowadays, the child adopts and acquires various musical experiences on a daily basis, not only in educational situations. From a socio-cultural perspective, anything that occurs in the community and practice can be relevant and represent a source of a child's knowledge (Lave and Wenger, 1991). Assuming that children also bring with them "home technological knowledge" (McPake, Plowman and Stephen, 2013), they are likewise active co-creators of their musical culture (Vestad, 2013, 2014). Hence, music streams into children's lives through different media like TV, DVD player, mobile devices, recordings, and other forms of information communication technology (ICT). There are also Disney and DreamWorks productions, the children's music networks that transmit music to children enriching their musical repertoire at homes, community, preschool, and school

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environments (Lum and Shehan Campbell, 2007; Shehan Campbell and Lum, 2007). The emergence of the World Wide Web (www) and the Internet, which provides new, easily accessible ways to gain musical experiences, also contribute to the vast presence of music in children's everyday life (Parra-Damborenea, 2014). Children are therefore surrounded daily by both video and audio media (radio, CD player) through which they listen to and receive music. Based on such incentives as well as using digital, mobile, and software applications, preschool children furthermore have the opportunity to create music (McPake, Plowman and Stephen, 2013; Paule-Ruiz et al., 2017). Certain research confirm that the methodology of music education has numerous benefits from the use of new educational technologies – ICT (Bauer, Reese and McAllister, 2003; Savage, 2007; Wise, Greenwood and Davis, 2011; Riley, 2013). Mobile learning and game-based learning are new approaches characterized by the utilization of mobile devices that enable learning anywhere and at any time (Paule-Ruiz et al., 2017). In addition, touch-based interaction can also be employed to practice motor skills and spatial abilities (spatial learning) (Parra-Damborenea, 2014).

Regardless of the contemporary context in which children are nowadays constantly surrounded by different media and different forms of digital technology through which they gain musical experiences, music education is under-represented in early and preschool education (Ilari and Gluschankof, 2009). In line with the present digital age and changes in the image of the young music learner, O'Neill (2012) points to the importance of a developed awareness for the need to provide different opportunities and forms of involving children in music activities. In this context, the musical and digital competencies of teachers and educators are immensely important. For technology integration into the upbringing and education of children, it is primarily necessary to develop the competencies of educators in this field. Various documents and research point out that it is essential to integrate this way of acquiring musical skills and knowledge into the curriculum at all levels and for each child or student (Rose and Meyer, 2002; National Council for Accreditation of Teacher Education, 2008; Shillady and Parikh, 2012; International Society for Technology in Education [ISTE], 2014; Ministry of Science and Education of the Republic of Croatia [MSE], 2011; MSE, 2014). Also, the conducted research confirm that the competencies of educators are one of the most influential factors in the integration of technology into education (Belland, 2009; Bingimlas, 2009; Brinkerhoff, 2006; Chen, Looi, and Chen, 2009; Hew and Brush, 2007; Inan and Lowther, 2010; Karaca, Can and Yildirim, 2013; Scherer, Siddiq and Tondeur, 2019; Dogan, Dogan and Celik, 2021; Lee and Tsai, 2010).

Accordingly, in order to further improve this field, special attention should be paid to further research into the competencies of educators. Specific technological knowledge and skills are not enough to integrate these values into education. Taking into consideration that digital competencies include pedagogical knowledge in addition to technological, a combination of these proficiencies is a prerequisite for implementation of technology in educational process (Kabakçi Yurdakul and Çoklar, 2014). Unlike the so-called techno-centric integration approach, attention should be focused on the techno-pedagogical approach (Kabakçi Yurdakul et al., 2012), because the former is focused on technology and teachers acquisition of technological knowledge and skills, while the techno-pedagogical integration approach is focused on pedagogical aspect of technological integration into educational situations. From the stated angle, in this research is represented one of the approaches that is applied in the field of early and preschool education – the TPACK model (Kabakçi Yurdakul et al., 2012).

TPACK model for teacher education was shaped by joining assistive technology to existing theoretical framework (Marino, Sameshima and Beecher, 2009). By means of the same theoretical framework the ICT-TPCK model was also developed (Angeli and Valanides, 2009). Moreover, from this pedagogical approach was formed the ICT-TPCK that combines intersection of content, learners, context, and ICT components while in other study the pedagogical content knowledge with the web knowledge were combined with the aim to create the framework of Technological Pedagogical Content Knowledge-Web (Lee and Tsai, 2010). For the purpose of professional development of science teachers' competencies, TPACK model represents the base for the specific integrated model Technological Pedagogical Science Knowledge (TPASK) (Jimoyiannis, 2010). Several research further indicate the need for further development of this theoretical framework in order to apply it in different areas of education and specific subject areas. Despite the numerous papers and research related to the theoretical framework of TPACK, there are few papers focused on the application of this theoretical framework in the context of preschool education (Chai, Koh and Tsai, 2013; Liang et al., 2013; Voogt et al., 2012; Hsu et al., 2014; Santos and Castro, 2021; Valtonen et al., 2017). Insufficient representation of this theoretical framework in the context of early and preschool education (ECE) can be attributed to the low level of ICT competencies of educators or the lack of resources and technical support in the milieu of early and preschool education (Li, 2006). Also, it is precisely because of these factors that are attributed to the underrepresentation of this theoretical framework in the context of ECE in later research (Liang et al., 2013). Namely, until the

appearance of the mentioned theoretical framework of TPACK (Mishra and Koehler, 2006), there was no theoretical framework that would direct the professional development of educators in this field.

Aware of the possible problems that technology can cause in a child's development, Liang et al., (2013) point out that regardless of them, it is more important that educators create the necessary form of TPACK that will best suit their unique educational context. Also, they further believe that given the many advantages of the application of technology in the context of education, it is important that its adequate application is supported by appropriate knowledge of the theoretical model by educators. This method of application is deemed a considerably better choice compared to its avoidance in working with children (Liang et al., 2013). The authors of the research related to the application of TPACK in the context of ECE point out that it is necessary to test this theoretical model in different contexts given its many potentials and application (Voogt et al., 2012; Chai et al., 2013; Voogt and McKenney, 2016; Valtonen et al., 2020). In addition, since Chai et al. (2013) further emphasize, that it is essential for the theoretical framework to be contextualized for specific content, technology and pedagogy, the aim of this paper is to apply this theoretical model in the context of preschool music education.

Materials and methods

The objective of the study, research questions, and instrument of data collection

The purpose of this study is to conduct reliability and validity analysis of instrument – TPACK-deep: a technological pedagogical content knowledge scale (Kabakçi Yurdakul et al., 2012; Liang et al., 2013) by using Exploratory Factor Analysis (EFA), in order to show adjusted TPACK-deep scale's application in the context of preschool music education. Also, the paper seeks to measure preservice teachers' self-assessment of their knowledge, skills, and competencies regarding technology integration in preschool music education.

In order to accomplish the objective, the following research questions were defined:

1. Is the reliability and validity of the adopted instrument adequate?
2. How do preschool teachers assess their technological pedagogical content knowledge (TPACK) in the context of preschool music education?
3. Is there a correlation between the preschool teachers' years of service and TPACK scales?

As an instrument of data collection in this research, a TPACK survey was used (Kabakçi Yurdakul et al., 2012; Liang et al., 2013) which was altered to include digital competencies in the context of preschool music education and contains the following subscales: music content knowledge (MCK), pedagogical music content knowledge (PMCK), technological knowledge (TK), competencies for using digital tools (CFUDT) and technological competencies in the context of music activities (TCCMA), respectively. The exploratory factor analyses indicated adequate reliability and validity of the adjusted TPACK-TCCMA survey.

The respondents

A total of 190 preschool teachers and educators participated in this research. The majority of the respondents (N=179; 94,2%) were currently attending graduate study of Preschool teacher education. Thereby 69,8% (N=125) were in the first year of graduate study while 30,2% (N=54) attended the second year of graduate study. Most of the participants (60,5%; N=115) were currently employed in a preschool facility with the average work experience of 11 years. In addition, 35,8% (N=68) of them were not working in practice while 3,7% (N=7) had part-time jobs in preschools. The largest number of the participants (45,3%; N=86) was in the age group of 18-25 years, 21,1% (N=40) 40-50 years, 17,4% (N=33) 25-30 years, 15,8% (N=30) 30-40 years and 0,5% (N=1) 50-65 years. The participants were predominantly female (N=188; 98,9%) while only 1,1% (N=2) were male, which is in line with the percentage of preschool teachers in Croatia. Furthermore, 59,5% (N=113) of the respondents didn't attend any form of music education before joining the faculty, while 40,5% (N=77) acquired some kind of music education before attending the faculty of preschool education. Additionally, 46,8% (N=89) attended some form of music education for less than a year, 20,5% (N=39) in the duration of 1-3 years, 13,5% (N=25) for less than a year, 11,6% (N=22) for 3-6 years, 4,7% (N=9) for more than 10 years and 3,2% (N=6) for 6-10 years. The vast majority of participants (N=173; 91,1%) didn't attend additional forms of ICT courses before gaining knowledge in this area on faculty, while 8,9% (N=70) of them participated in some type of ICT education.

Results

The results of the Exploratory Factor Analysis (EFA) revealed that preschool teachers' responses on the instrument TPACK-deep: A technological pedagogical content knowledge scale (Kabakçi Yurdakul et al., 2012; Liang et al., 2013) adapted to research digital competencies in the context of preschool music education could be grouped into five factors. The factors contained are music content knowledge (MCK); pedagogical music content knowledge (PMCK); technological knowledge (TK); competencies for using digital tools (CFUDT) and technological competencies in the context of music activities (TCCMA). Thereby, principal component analysis as an extraction method with oblimin rotation was used. Items with factor loading less than 0,5 were deleted. KMO and Bartlett's Test show that sample size is appropriate with a number of variables taken for the study (KMO=,923; Chi square=3809,820, df=453, $p<,05$). The scales accounted for 75,977% of the total variances (Table 2). The Eigenvalues of the five scales listed were all greater than one. The reliability (alpha) of the overall scale was 0,96 and the reliability coefficients for the scales were from 0,86 to 0,95. This suggests that adapted five scale TPACK-TCCMA for preschool music education can be considered adequate for measuring preschool teachers' digital competencies in the context of preschool music education.

The TPACK-TCCMA survey initially included 33 items, divided in six scales:

1. content knowledge (CK) was equaled to music content knowledge (MCK) – the scale was assessing the preschool teachers' knowledge about music in general.
2. pedagogical knowledge (PK) – the scale evaluated pedagogical competencies and methods for implementation of music activities in preschool education process.
3. pedagogical content knowledge was adjusted as pedagogical music knowledge (PMK) – the scale was measuring the ability of preschool teachers to implement the various pedagogical strategies for acquiring musical content in preschool situations.
4. technological knowledge (TK) – the scale was used to evaluate the level of preschool educators' digital competencies in the context of general user digital competencies framework.
5. technological pedagogical and technological content knowledge combined as technological music knowledge (TMK) – the scale was assessing the preschool teachers' competencies necessary to use technology in music activities with children.
6. technological pedagogical content knowledge (TPACK) became technological pedagogical music content knowledge (TPACMK) – the scale was evaluating the implementation of information communication technology in order to conduct music activities with children by integrating musical content, ICT and the fundamental postulates of music pedagogy.

Particles from the existing questionnaire which were deleted because of the factor loading less than 0,5 were mostly connected with the creation of digital content, thus the respondents were not able to create web pages, to regularly follow the advance in new information communication technologies and didn't have a possibility to facilitate children with the appropriate use of ICT for communication during the group music activities. The probable reasons for these results lie in the accessibility of ICT in preschool facilities as well as in the insufficient preschool teachers' level of competencies for creating digital content, a factor that acquires sustainable level of technological knowledge.

The results of exploratory factor analysis (EFA), according to Keiser Guttman and Scree plot test criterium, with oblimin rotation displayed in Table 1 revealed that responses can be grouped in five scales: music content knowledge (MCK); pedagogical content knowledge (PCK), technological knowledge (TK), competencies for using digital tools (CFUDT) and technological competencies in the context of music activities (TCCMA). The first factor of music content knowledge (MCK) partially merged content knowledge (CK) and pedagogical knowledge (PK) from the original survey, consequently consisting of seven items used to assess the knowledge about music content and the implementation of music activities in working with children. The second factor was pedagogical music content knowledge (PMCK) consisted of six items related with the various aspects of implementing music activities (solving problems, understanding the content, encouraging the children to express themselves, involve children in practical activities and manage the acquisition of knowledge). The third factor was technological knowledge (TK) with three items regarding the use of computers, acquiring new digital skills and solving technical problems. The fourth factor was competencies for using digital tools (CFUDT) with six items related to the use of social media and communication tools (messaging and video calls) in everyday life and supporting children in use of technology in the context of music. This factor emerged from the initial technological knowledge (TK) scale, while the fifth factor was technological competencies in the context of music activities (TCCMA) with eight items initially amalgamated from technological music knowledge (TMK) and technological

pedagogical music content knowledge (TPMCK).

The results of the exploratory factor analysis suggest that adapted five scale TPACK-TCCMA for preschool music education can be considered reliable for measuring preschool teachers' digital competencies in the context of preschool music education, thus answering positively to the first research question.

Table 1
Rotated Factor Scores from Pattern Matrix (Oblimin Rotation) for the scales of the adapted TPACK-TCCMA survey for preschool teachers

Item	Measure	Factor loading
MCK	I have sufficient knowledge about music necessary to work with children.	-0,81
MCK	I can think about music content on a professional level.	-0,83
MCK	Independently, without help, I can understand the musical content that I need to carry out musical activities in working with children.	-0,74
MCK	I believe that I can sovereignly and safely carry out musical activities in working with children.	-0,82
MCK	I am able to carry out various forms of musical activities in working with preschool children (singing a song, performing singing games, counting, playing Orff instruments, creative activities, etc.).	-0,62
MCK	I am able to approach the implementation of musical activities in working with children in an integrated way.	-0,60
MCK	I can plan and implement group music activities in working with children.	-0,63
PMCK	Without the use of information and communication technology (ICT), I can solve the usual doubts related to the implementation of musical activities in working with children.	0,71
PMCK	Without the use of ICT, I can help children in various ways to understand music content and acquire musical skills and knowledge.	0,87
PMCK	Without the use of ICT, I can deal with the common difficulties that children face in music activities.	0,88
PMCK	Without the use of ICT, I can encourage children to express their own musical experience and experiences, emotions, imagination, etc.	0,90
PMCK	Without the use of ICT, I can actively involve children in practical music content and activities.	0,88
PMCK	Without the use of ICT, I can encourage children to express their own musical experience and experiences, emotions, imagination, etc.	0,90
PMCK	Without the use of ICT, I can actively involve children in practical music content and activities.	0,88
PMCK	Without the use of ICT, I can direct children to manage the acquisition of music content.	0,86
TK	I believe that I possess the digital competencies necessary for the effective use of computers.	-0,76
TK	I think I can easily acquire new computer/digital skills.	-0,74
TK	I know how to solve my own technical problems when using computers and information and communication technology.	-0,84
CFUDT	I can independently use social media such as Facebook, Instagram, Twitter, etc.	0,74
CFUDT	I can independently use digital communication tools to send messages (email, Viber, WhatsApp, Messenger, etc.).	0,78
CFUDT	I can independently use digital communication tools for video calls (Skype, Zoom, Google Meet, Webex, etc.).	0,74
CFUDT	I am able to facilitate children to use technology to find information about music on their own or with the support of educators, parents or adults.	0,56
CFUDT	I am able to support children to use technology to construct different forms of knowledge presentation (e.g., music-didactic games).	0,62
CFUDT	I have a capacity to make it easier for children to collaborate with each other using technology (in pairs or in small groups).	0,55

TCCMA	I am able to use various computer programs created to acquire musical knowledge.	0,74
TCCMA	I know information and communication technologies that I can use to facilitate the adoption of music content.	0,69
TCCMA	I can use appropriate information and communication technologies to present music content (e.g., multimedia sources, music picture books in multimedia format, animated music content, etc.	0,70
TCCMA	I can use some specialized computer games to check the acquired musical skills and knowledge of children (e.g., sound memory, games for recognizing sounds, instruments, etc.)	0,65
TCCMA	I can choose the information and communication technologies that I will use to improve and enhance the way of conducting activities in working with children.	0,77
TCCMA	I can use strategies that combine content, technologies and methods and implement them in the process of conducting musical activities in working with children.	0,81
TCCMA	I can provide guidance in helping others to coordinate the use of content and information and communication technologies in their preschool.	0,71
TCCMA	I can design music activities that appropriately integrate music content, information and communication technology and the basic laws of music pedagogy for learning appropriate for preschool children.	0,77

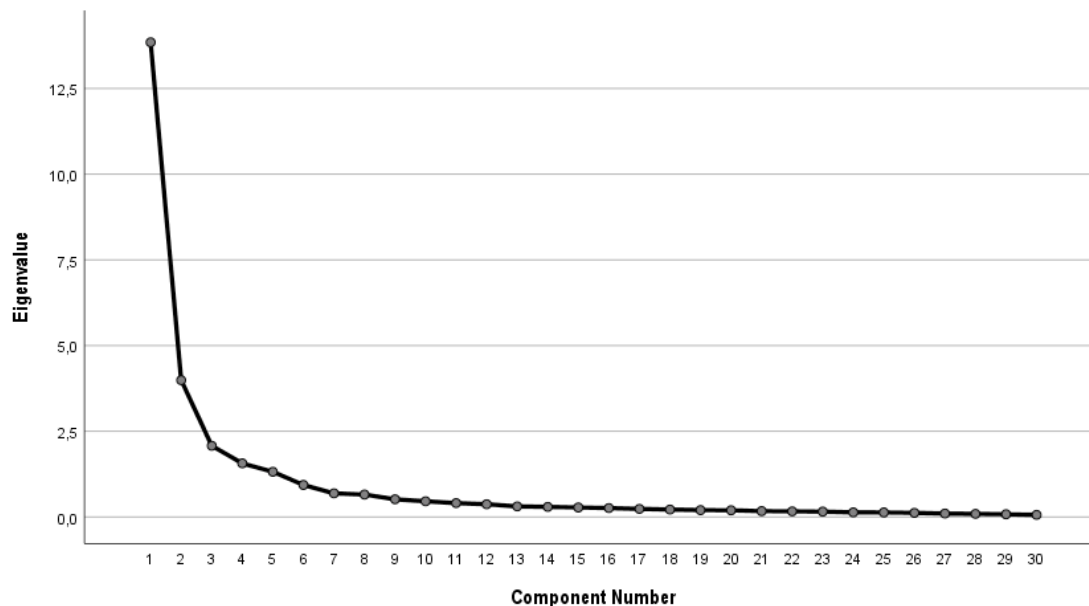


Figure 1. Scree plot

Table 2
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.85	46.15	46.15	13.85	46.15	46.15
2	3.99	13.30	59.45	3.99	13.30	59.45
3	2.08	6.92	66.38	2.08	6.92	66.38
4	1.56	5.21	71.59	1.56	5.21	71.59
5	1.32	4.39	75.98	1.32	4.39	75.98

Table 3
Correlations for five factors

	1	2	3	4	5
1		0,27	0,36	-0,32	-0,30
2			0,23	-0,52	-0,21
3				-0,31	-0,36
4					0,35
5					

The second research question led us to explore the self-assessment of preschool teachers' regarding the technological pedagogical content knowledge (TPACK-TCCMA) in the context of preschool music education. The respondents' mean scores on the five scales of the adjusted TPACK-TCCMA survey (presented in Table 4) for the factors obtained were all over the mid theoretical range. The preschool teachers attained the highest scores on the competencies for using digital tools (CFUDT) scale with an average of 4,46 per item following a technological knowledge (TK) scale with an average of 4,17 per item on a 1 – 5 Likert scale. The lowest scores of the adjusted TPACK-TCCMA scale preschool teachers attained on the pedagogical music content knowledge scale (PMCK) with an average of 3,70 per item, and technological competencies in the context of music activities scale (TCCMA) with an average of 3,66 per item. These results indicate that most of the preschool teachers tend to demonstrate high agreement with items implying their high digital tools competencies as well as their technological knowledge. Nevertheless, these results suggest that a number of preschool teachers distinguished the use of proper instruction to teach the premeditated music content knowledge (PMCK) and possessed the capacity to adjust technological competencies in performing music activities with preschool children.

Table 4
Descriptive data on the five scales of adjusted TPACK-TCCMA survey

	Mean	Std. Deviation	Skewness		Kurtosis	
			Statistic	Std. Error	Statistic	Std. Error
MCK	3,87	0,79	-0,77	0,18	1,01	0,35
PMCK	3,70	0,87	-0,40	0,18	-0,04	0,35
TK	4,17	0,86	-1,15	0,18	0,96	0,35
CFUDT	4,46	0,62	-2,05	0,18	6,63	0,35
TCCMA	3,66	0,89	-0,47	0,18	-0,35	0,35

The last part of this research examined the role of preschool teachers' experiences and praxis in their responses to the adjusted TPACK-TCCMA survey. For this purpose, participants were divided into two independent groups: those with working experience in a preschool facility and participants without such experience. An independent sample t-test is used to identify these differences. The mean score of

participants with experience in praxis was ,64 with a standard deviation of ,06 while participants without praxis scored a mean value of ,59 with a deviation of ,07 (Table 5). Equality of variance was confirmed with Levene's Test (Table 6) whose significance value was higher than ,05 ($F=,016$, $p=,90$). Results of the t-test for independent samples showed that, on the population level, participants with experience in preschool practice scored significantly higher results on adjusted TPACK-TCCMA survey ($t= -2,143$, $df = 181$, $p<,05$).

Table 5
Descriptive data regarding the working experience

	ME (SD)	MNE (SD)	t	df	p
Adjusted TPACK total result	3,84 (0,64)	4,04 (0,60)	-2,143	181	0,033

Legend: ME= Mean score for preschool teachers with experience in praxis, MNE= Mean score for preschool teachers with no experience in praxis, SD= standard deviation, t=t-test value, df=degrees of freedom, p= level of significance

Table 6
The results of the Levene's test for equality of variances

		Levene's Test for					
		F	Sig.	t	df	Sig. (2-tailed)	Difference
total score	Equal variances assumed	,016	,899	-2,143	181	,033	-,204

Discussion

In this research, we have explored the self-assessment of preschool teachers' digital competencies and their implementation in the context of preschool music education by using the modified TPACK-TCCMA survey initially created on the basis of the combined questionnaires TPACK (Kabakçi Yurdakul et al., 2012) and TPACK-deep: a technological pedagogical content knowledge scale (Liang et al., 2013). Primary, the reliability and validity analysis of instrument combined from different factors was confirmed like in previous studies (Liang et al., 2013; Hsu et al., 2014; Kabakçi Yurdakul et al., 2012; Lee and Tsai, 2010; Jimoyiannis, 2010) while finding similarities in merging factors (Liang et al., 2013; Lee and Tsai, 2010), thus creating a five scale TPACK model (Lee and Tsai, 2010; Valtonen et al., 2017) adequate for measuring preschool teachers' digital competencies in the context of preschool music education (Kabakçi Yurdakul et al., 2012).

Upon the validation of the instrument, the respondent sample was analyzed in order to present the fact that 59,5% of the participants didn't have any form of music education and 91,1% were without the additional ICT education. These are the reasons why the results obtained for the factors of pedagogical music content knowledge scale (PMCK) and technological competencies in the context of music activities scale (TCCMA), were the lowest among the mean scores which differ from particular research (Hsu et al., 2014) being in the meantime in line with the other research (Liang et al., 2013). Furthermore, the greatest knowledge is shown on the competencies for using digital tools (CFUDT) scale with an average of 4,46 per item, succeeded with an average of 4,17 per item on a technological knowledge (TK) scale, which is in line with the constatation that the so-called Z-generation predominant in this research possessed the highest level of general digital competencies and were consequently familiar with the use of ICT at the substantial point, although Hsu and Chen (2018) specified that "results differ from the perception that younger teacher will tend to have more technological knowledge". This is also in correlation with several studies regarding the necessary level of digital competencies as a prerequisite to implementation of technology in educational process (Panagiotakou and Pange, 2010; Hsu, Tsai and Liang, 2011; Ralph

and Petrina, 2018).

In the final part of this research the role of preschool teachers' experiences and praxis in their responses to the adjusted TPACK-TCCMA survey were examined. The results showed that participants with experience in preschool practice obtained significantly higher results on adjusted TPACK-TCCMA survey ($t = -2,143$, $df = 181$, $p < .05$), indicating the praxis experience as an important factor of implementing technology in performing music activities with children in preschool education context (Liang et al., 2013).

Conclusion

The contribution of this paper is reflected in the application of the theoretical model TPACK-TCCMA in the context of ECE and its adaptation in music education. Although the obtained results indicate that the work experience of educators is a significant factor that contributes to better self-assessment of educators' competencies in using digital tools (CFUDT) ($M = 4,46$), it is necessary to further develop both musical and pedagogical competencies of educators so that competencies for using digital tools (CFUDT) could be applied in the context of preschool music education. Also, it is necessary to further develop the technological, pedagogical and musical competencies of educators in the field of technological and pedagogical knowledge both during their studies and within their lifelong education. The modern way of life requires adaptation to new generations, the so-called Generation Alpha growing up using technology. Therefore, it is necessary to bring musical knowledge and skills closer to children. In this way, it will considerably contribute to the further development of both the child's musical and creative abilities. In addition, such an approach to music education will also contribute to the development of the digital competencies of children.

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Conflict of interests

The authors declare no conflict of interest.

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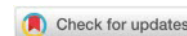
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Cognitive and Metacognitive Strategies in Foreign Language Listening Comprehension at The Studies of Tourism – Students' Preference and University Lecturers' Utility Rating

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Abstract: Being the primary channel of incoming information in spoken communication, listening comprehension is one of the key skills of the second language acquisition to be mastered. Since it is a complex concept implying different types of knowledge, it is assumed nowadays that improving strategic behaviour of students would lead to a more efficient use of listening comprehension. Thus, the aim of the present study is to gain the insight into the strategic behaviour of the freshmen university students through testing cognitive and metacognitive strategy preferences. Moreover, the study included strategy utility rating by university lecturers. The study employed a questionnaire to draw data that were processed by means of mathematical statistics and utility value analysis, whereas the use of Pareto analysis pointed to the set of preferable strategies. The results obtained in the study testify to rather uniform preference ascribed to listening comprehension cognitive and metacognitive strategies by skilled and less skilled first-year university students. On the other hand, the results obtained by university lecturers are consistent with the current literature on the issue. Thus, the set of desirable strategies points to the cognitive strategies of linguistic inferencing, global prediction and academic and world elaboration, i.e. metacognitive strategies of monitoring, directed attention and evaluation as those contributing most to efficient listening comprehension.

Keywords: *second language acquisition, listening comprehension, cognitive strategies, metacognitive strategies, strategic behaviour.*

Introduction

Despite its nature that makes it the primary channel of incoming information in spoken communication, the importance and development of listening comprehension in the second language acquisition had remained neglected for a long period of time before the emergence of a vast body of literature looking into the issue from different perspectives (Magyar, Habók and Molnár 2022; Mulyadi et al., 2022; In'nami and Koizumi, 2021; Fathi, Derakhshan and Torabi, 2020; Razmi, Jabbari and Fazilatfar, 2020). Namely, it was long maintained that the active development of the language skills such as speaking, reading and writing would unavoidably lead to the improvement of listening comprehension (Nunan, 2002; Rost, 2005; Goh, 2008). However, listening comprehension is not just a skill that an individual possesses whose main purpose is enabling the understanding of information contained in incoming speech. It is a phenomenon (Vandergrift, 1999; Rost, 2002, 2005) consisting of two types of competence - linguistic and strategic (Buck, 2001). Linguistic competence is a complex concept that includes several different forms of knowledge, such as the knowledge of phonetics, syntax, semantics, pragmatics and discourse analysis. On the other hand, strategic competence encompasses various cognitive and metacognitive processes necessary to connect the existing language knowledge of an individual with his/her other forms of knowledge. Since the results of previous research indicate interconnectedness between the effective use of language acquisition strategies and listening comprehension, the presentday authors maintain that developing listening comprehension implies conscious work on developing cognitive, metacognitive, affective and social dimensions of language acquisition (Oxford, 1990; O'Melly and Chamot, 1990; Vandergrift, 1999). The development of these dimensions, i.e. strategies, is primarily aimed at improving the process of learning and making students independent learners (Chamot, 2005; Little, 1991; Pešić,

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2017b). At the same time, students' attention should be focused on identifying their desirable strategies, since the use of these should greatly facilitate the process of listening comprehension, as the basic channel of foreign language input, and thus make the acquisition of a foreign language more efficient, which is also emphasised by Chamot (2005).

The results of previous research undertaken with the subjects of different age show that the respondents whose level of language proficiency is low keep processing listening input at a surface level showing inability to activate in-depth comprehension (O'Malley, Chamot and Kupper, 1989, Goh, 2008). This deficiency could be solved by the implementation of strategies both cognitive and metacognitive.

Despite an immense body of research dealing with the use of strategies in listening comprehension, the achieved results differ to the extent that does not allow for too many generalisations on their use. However, there is a common agreement that the use of strategies has a positive effect on language acquisition (Wong and Nunan, 2011; Wenden, 2002; Cohen, 1998), and consequently the positive motivation of students. The positive correlation between metacognitive behaviour, achievement and motivation among student population is also confirmed by research in other fields of education (Balashov, Pasichnyk and Kalamazh, 2021). Furthermore, the correlation between students strategic behaviour and cultural background has been pointed out by several authors (Oxford, 1990; Chamot, 2004; Olivares-Cuhat, 2002), justifying the research of students' strategic behaviour in different cultural contexts.

Having in mind the abovementioned, the study presented in the paper aims to look into the preference of using cognitive and metacognitive strategies in listening comprehension by the skilled and less skilled first-year students of tourism in Serbia and compare the results achieved with the evaluation of strategy utility provided by university lecturers. Triangulated in such a way, the obtained results should indicate a set of preferable strategies that would lead to a more efficient listening comprehension, and consequently second language acquisition.

Strategic behaviour of tertiary-level students in listening comprehension

The attention of both researchers and teachers began to focus more intensively on the strategies in the last decades of the twentieth century, when the idea of using context as a crucial factor contributing to listening comprehension became the prevailing one in foreign language teaching. Namely, it was believed that all lacks in understanding caused by distractions in receiving a message and/or inability to understand lexical items can be compensated by the knowledge of context. Such an attitude resulted in an increased interest in different factors contributing to listening comprehension, such as schematic knowledge (Hu, 2012), knowledge of the topic (Chiang and Dunkel, 1992; Rahimi, 2012; Sulistyo, 2011), and text type and situation (Rahimi 2012; Sulistyo, 2011). As a result of such an intense research, the need arose as to classify the identified strategies. There have been several attempts to classify both language acquisition strategies (Oxford, 1990; O'Malley and Chamot, 1990) and listening comprehension strategies (Rost and Ross, 1991; Vandergrift et al, 2006; Vandergrift and Goh, 2012) so far. Still, each classification included the groups of cognitive and metacognitive strategies that stand out as the most prominent ones. Cognitive strategies are employed in the controlled use of the material that needs to be learned. They are more directly related to the learning task to be accomplished and involve manipulation of the material to be acquired (O'Malley and Chamot, 1990). According to O'Malley and Chamot (1990), they are theoretical processes involved in learning. This is also the most numerous group of strategies. It includes the use of linguistic and learning resources (translation, transfer, deduction/induction), substitution, inferencing, elaboration, prediction, contextualisation, reorganising (summarisation, grouping, note taking, repetition) (Vandergrift and Goh, 2012). Since they imply material processing, cognitive strategies are considered to be on-line strategies, i.e. those used during the very listening process.

Metacognitive strategies concern the planning, regulation and management of the learning process. Thus, not being directly related to the learning material, they are at a level above the cognitive transformation of the information received and its processing. In other words, they include thinking about the learning process, planning the task to be performed, monitoring the task being performed, and evaluating the task performed (Chamot, 2005). The aforementioned testifies to the fact that metacognitive strategies are employed not only during the entire process of listening comprehension, but prior and after listening (off-line) as well. They include planning, focusing attention (directed attention and selective attention), monitoring and evaluation (Vandergrift and Goh, 2012). According to O'Melly et al. (1985), '[...]students without metacognitive approaches are essentially learners without direction and ability to review their progress, accomplishments, and future learning directions'. The importance of metacognitive knowledge and its impact on the overall performance in learning have been pointed out in some other areas of research as well. Thus, Karpov and Skityayeva (2002) indicated that the misuse of metacognitive knowledge could negatively affect students' performance. For this reason, it is important to raise awareness

of metacognitive strategies among university students (Pešić and Radovanović, 2018) and introduce them to different sub-strategies, whose skilful management can lead to a positive outcome in language acquisition and their independence in the learning process (Pešić, 2017b).

Most research focused on listening comprehension looked into strategic behaviour of skilled and less skilled students, i.e. students with a higher or lower level of language proficiency. The obtained results pointed to the fact that skilled students were more open and flexible in the use of strategies, showing strong control of their use (Anderson, 2005; Green and Oxford, 1995; O'Malley and Chamot, 1990; Wharton, 2000; Magogwe and Oliver, 2007; Rao, 2016). The range of the used strategies, both cognitive and metacognitive, varied to a high degree (Khaldieh, 2000; Wu, 2008; Rao, 2016), depending on the task type, the respondents' age and language level (Habók and Magyar, 2018). However, most often used strategies were monitoring, elaboration, inferencing, prediction and evaluation. The group of skilled students showed the ability to anticipate failure in comprehension and prevent it by using different sources of knowledge (Magogwe and Oliver, 2007). When the process of comprehension was interrupted, they managed to regain concentration consciously and with ease. In their process of comprehension, two types of information processing were identified – top-down and bottom-up. The results also testify to the pronounced use of context, i.e. connecting what they heard with the knowledge they already possessed (Ovilia, 2018). The best results on the listening comprehension tests were achieved by the respondents who were able to interactively use different sources of knowledge, to activate different strategies (not in isolation, but rather in a combination), and who approached the task to be solved holistically (not as a string of isolated items) (Goh, 2002; Vandergrift, 2011; Nunan, 1991).

In the process of listening comprehension, less skilled students were more focused on the text and its semantic and syntactic features (O'Malley et al., 1985). Trying to use their prior knowledge of the world, they were often unable to connect the incoming information with the already existing knowledge or experience. Thus, they approached the tasks locally, focusing on the elements present immediately in the text. They reached certain information in the text with a delay, as they would focus on words or parts of the discourse they did not understand, persistently trying to reveal the meaning (Nunan, 1991). When listening, they divided the text into segments, listening word for word, and when it comes to information processing, they were almost exclusively relying on bottom-up processes (O'Malley, Chamot and Kupper 1989; Chamot and Kupper 1989; Goh, 2002). With this group of subjects, the use of cognitive strategies prevailed, with translation as the most commonly used one. Such results further point to the fact that less skilled students neither were in control of their listening comprehension nor did they think about the course of the process and the arising problems, which certainly affected the overall process of language acquisition. The results of several studies (Vandergrift, 2003, 2011; Goh, 2002; Vandergrift and Goh, 2012) showed both groups to have been using the strategy of monitoring comprehension with a similar frequency, but with different efficiency. Cognitive strategies, such as elaboration and reasoning, were used in the same way. The difference in use was reflected in the fact that skilled students used the aforementioned strategies more efficiently, i.e. in combination with other strategies, which led to a more efficient listening comprehension (Vandergrift 1997, 1998, 2003, 2011; Goh and Taib, 2006).

Despite a large number of studies, it is almost impossible to identify a pattern in strategic behaviour which directly depends upon the level of language knowledge. However, the research results proved the existence of a correlation between students' strategic behaviour and success in foreign language acquisition (Oxford et al, 2004).

A notable gap in the recent literature on the issue of listening comprehension strategy use is the lack of university lecturers' attitude on the utility of individual listening comprehension strategies compared to the students' strategic behaviour. Apart from triangulation, the importance of involving university lecturers teaching English for Specific Purposes (ESP) at different faculties in the current study is to reduce the degree of possible subjectivity, which influences the decision on university course curriculum and syllabus, since it is lecturers who directly decide on a course design and the choice of teaching materials to be used. Besides, such results are expected to make a sound contribution to those attained for students' strategic behaviour indicating the type of sub-strategies that should be implemented into a foreign language course curriculum.

Materials and Methods

The aim of the undertaken diagnostic study is to (1) identify the preferences of using cognitive and metacognitive listening comprehension strategies of skilled and less skilled language users at the first year of university studies of tourism and (2) get insight into ESP university lecturers' perception of the utility of individual listening comprehension strategies.

In order to reach the aim, the following research questions were set:

1. Are there any differences between cognitive strategy preferences in listening comprehension of the skilled and less skilled language users?
2. Are there any differences between metacognitive strategy preferences in listening comprehension of the skilled and less skilled language users?
3. How do ESP university lecturers rate the utility of cognitive and metacognitive strategies for the process of listening comprehension?, and
4. Which strategies make the set of most useful ones for effective listening comprehension?

The present study includes two groups of subjects - the first one being 70 students of the first year of academic studies and the second one comprising 8 university lecturers teaching ESP at six tertiary-level institutions in Serbia, the members of both groups of subjects being those who voluntarily agreed to take part in the study. The choice of the freshmen is quite understandable, having in mind that course syllabi should be fine-tuned according to the ability of the learners. Thus, it is of utmost importance to identify their strengths and weaknesses as independent learners at the very beginning of the teaching process. On the other hand, university lecturers are decision-makers when it comes to syllabi and curricula of a university course as well as teaching materials to be used during instruction delivery. In such a way, their role in evaluating the importance and utility of language learning strategies is utterly justifiable.

In the first phase of the study, the students were tested on their language knowledge, which enabled their grouping into skilled and less skilled language users. To this aim, Oxford Placement Test (Allan, 2004) was employed. The Oxford Placement Test results revealed the language knowledge of 14 subjects to be at B2 level of Common European Framework (Council of Europe, 2020), whereas 56 subjects proved to be at A level. Thus, the former were categorised as the skilled language users (SLU), and the latter as the less skilled ones (LSLU).

In the second phase of the study, the questionnaire on cognitive and metacognitive strategy use was distributed to both groups of subjects, i.e. students and university lecturers in order to identify the preference of strategy use, i.e. get scores on the utility of the strategies for the process of listening comprehension, respectively. The questionnaire used for gathering data is based on Oxford (1990), Vandergrift et al. (2006) and Vandergrift and Goh (2012), and contains 17 statements employing 5-point Likert scale. Each of the statements describes possible strategic behaviour of the listeners in the process of listening comprehension, and should be rated on the scale 1 to 5, with 1 = never or almost never true of me to 5 = always or almost always true of me. In order to avoid any possible misunderstandings, the questionnaire statements were translated into Serbian. The Cronbach's alpha was 0.83, i.e. 0.87 for the observed student, i.e. instructor population, respectively. The data collected with reference to the research questions 1 and 2 were processed by use of mathematical statistics to get the averages. To measure the level of strategy preference, the following scale is employed (Oxford, 1990): 1.0 – 2.4 – low preference of strategy use (Likert scale rating 1 and 2), 2.5 – 3.4 – medium preference of strategy use (Likert scale rating 3), 3.5 – 5.0 – high preference of strategy use (Likert scale rating 4 and 5).

To answer the research question 3, the obtained data by the questionnaire undertaken with the lecturers were analysed by use of utility value analysis. This is a method employed to evaluate alternatives using utility as the crucial criterion. Furthermore, it is used in contexts characterised by a subjective notion of value. According to Vulanović et al. (2003), utility value is the subjective value of an entity which represents its ability to meet certain needs. In the context of the current study, it is the ability of one group of strategies, i.e. one sub-category, to enable spoken message comprehension. This issue comes to fore when deciding whether to include a strategy or a set of strategies in a foreign language syllabus that would include conscious work on developing listening comprehension. When analysing utility values, it is common to rank the parameters from 1 to 3, i.e. the most important, less important and least important, respectively. However, the present study employed a more sensitive 25-point scale, which resulted in data that are more sophisticated.

The set of strategies contributing most to the spoken message understanding was attained by the use of Pareto analysis, which enabled providing the answer to the research question 4. In relation to strategy use, Pareto analysis would help analyse the employed strategies in terms of their efficiency, i.e. their individual contribution to the overall understanding. It would mean that 20% of the used strategies would make the largest contribution to the process of comprehension. Thus, their identification and implementation into FL instruction would save time, to both instructors and students, and bring about the largest benefit for their users.

Results

Students' preferences of cognitive strategy use

Table 1 shows the averages of cognitive strategy use preferences by the skilled language users and less skilled language users, as well as the cognitive strategy utility, as described by the university lecturers. According to the data presented, the group of the skilled language users showed high preference of cognitive strategy use with the exception of note taking and prediction. Moreover, the results obtained for the Statements 1 and 2 testified to this group of subjects employing both bottom-up and top-down language processing. On the other hand, the group of less skilled language users used five out of ten cognitive strategies to a high degree and the remaining five to a medium degree. At the same time, they also proved to use both bottom-up and top-down processes in language processing.

Table 1

Cognitive strategies - students' preferences, lecturers' estimation of the strategy utility and the strategy rank (R)

S. No.			SLU	R	LSLU	R	Lecturer estimation	R
1	Prediction (Global/Top-down mental processing)	I use the general meaning of the text to help me understand.	4.5	1	3.93	4	0.1525	1
2	Prediction (Local/Bottom-up mental processing)	I use the details of the conversation to help me understand.	3.85	4	3.55	5	0.06	8
3	Reorganising (Grouping)	I think about the difference between the main idea and the details.	3.79	5	3.18	9	0.055	9
4	Inferencing (Extralinguistic)	Visualisation helps me understand what I hear.	3.5	8	3.39	6	0.1175	6
5	Elaboration (Academic)	If the topic is already learned, I pay more attention to listening.	3.79	6	4.09	3	0.1225	4
6	Elaboration (World/Person)	While listening, I always relate what I hear to what I already know.	4.30	2	4.14	2	0.125	2
7	Inferencing (Linguistic)	I can understand what the speakers say in-between the lines.	3.77	7	3.23	7	0.1225	5
8	Note Taking	Note taking helps me understand.	3.4	9	3.20	8	0.035	10
9	Inferencing (Linguistic)	I use the context to guess the meaning of the words I did not understand.	4.16	3	4.32	1	0.145	3
10	Prediction	I always make guesses about what is to happen.	3.37	10	2.96	10	0.065	7

Statements based on [Oxford \(1990\)](#), [Vandergrift et al. \(2006\)](#) and [Vandergrift and Goh \(2012\)](#)

Students' preferences of metacognitive strategy use

On the overall, the preference of metacognitive strategy use was rated high by the skilled language users and moderate by the group of less skilled ones. Problem identification and evaluation proved to be the least used strategies with the average below 3.0.

Table 2
Metacognitive strategies - students' preferences, lecturers' estimation of the strategy utility and the strategy rank (R)

S. No.	Strategy Type	Statement	Students				Lecturer estimation	
			SLU	R	LSLU	R		R
1	Directed Attention	I focus my attention to what I find important and discard less important information.	3.69	4	3.39	4	0.185	2
2	Evaluation	While listening, I think if my predictions have been confirmed.	3.36	5	2.96	5	0.1525	3
3	Monitoring	I actively think whether I understand the text. If I do not understand something, I continue	3.94	2	3.68	2	0.09	7
4	Monitoring	listening hoping that I would get the meaning later.	4.25	1	4.43	1	0.2075	1
5	Problem Identification	If I do not understand something, I think about that part and continue listening with no concentration.	3.12	6	2.93	6	0.0975	6
6	Directed Attention	If my thoughts wonder, I try to refocus my attention.	3.70	3	3.64	3	0.135	4
7	Problem Identification	If I do not understand something, I give up listening.	2.78	7	2.38	7	0.1325	5

Statements based on [Oxford \(1990\)](#), [Vandergrift et al. \(2006\)](#) and [Vandergrift and Goh \(2012\)](#)

Strategy utility rating

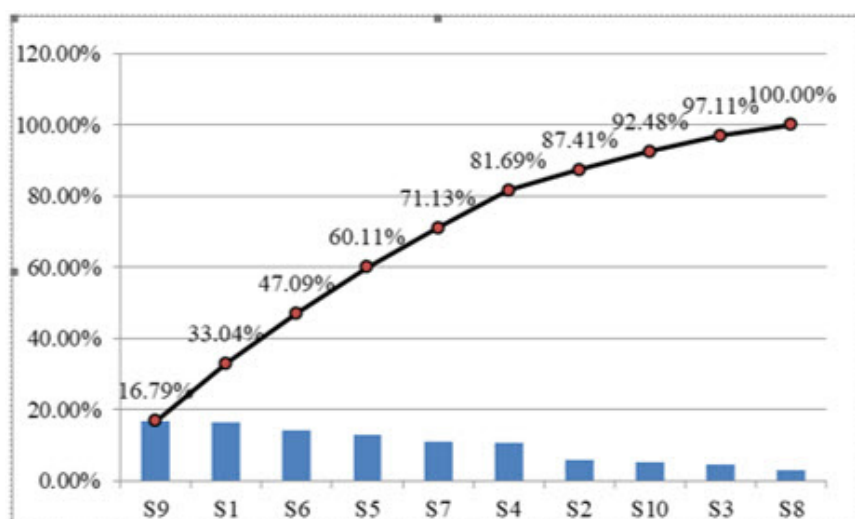
The university lecturers found prediction, elaboration and inferencing to be three most beneficial cognitive listening strategies. Note taking was found to be the least important one. The rating gained for the three most beneficial strategies coincided with the ratings obtained for strategy preferences of the skilled language users. The greatest discrepancy in the strategy rating between skilled language users and lecturers was noted with the strategies of local prediction (Statement 2) and grouping (Statement 3). Besides this, the rank of the remaining Statements is rather uniform.

The best-ranked strategy by the group of less skilled language users is linguistic inferencing (Statement 9 – 4.32). On the other hand, the least preferred strategy is prediction (Statement 10) (2.96), which is in line with the answers provided by skilled language learners, but significantly differs when compared to the utility rate provided by the lecturers. The ranking of the other two segments of prediction (global and local) also significantly differed. The overlapping in the obtained results of less skilled language users and lecturers is notable at the rank of elaboration, as one of the highly rated strategies, and inferencing and reorganising, which gained low rates.

The lecturers' ratings regarding the utility of metacognitive strategies showed monitoring, directed attention and evaluation to be the most useful. On the other hand, the least rated strategies were those describing students' behaviour leading to the loss of either concentration or motivation. When compared to the students' ratings, apart from two strategies with the overlapping ranks – monitoring and problem identification, the attitudes of students and lecturers vary.

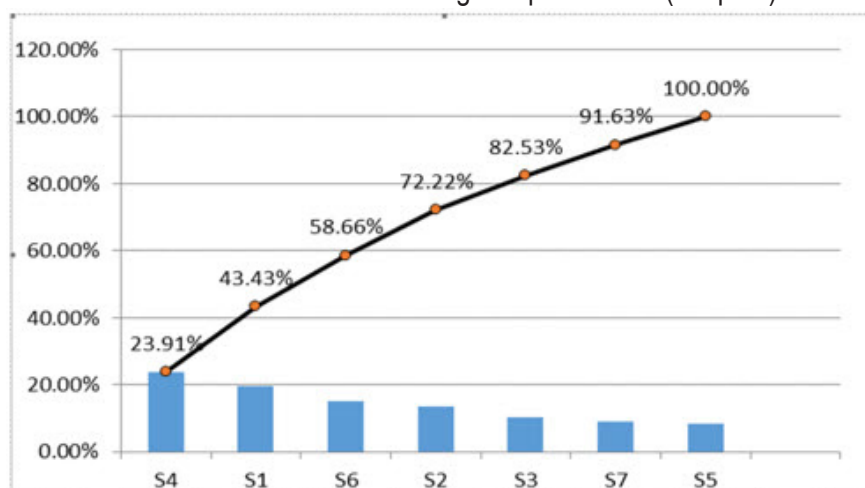
Most beneficial strategies

Taking into consideration the obtained answers provided by both groups of students and university lecturers, Pareto analysis pointed to the group of four cognitive strategies contributing most to efficient listening comprehension. Those were linguistic inferencing (Statements 9 and 7), global prediction (Statement 1), personal/world elaboration (Statement 6), and academic elaboration (Statement 5). They account for 71.13% of listening comprehension (Graph 1).



Graph 1. The overall influence of cognitive strategies on listening comprehension

As for the group of metacognitive strategy use, the Pareto analysis results pointed to the set of four statements, i.e. three strategies that the subjects found the most beneficial to message decoding. These were monitoring (Statement 4), directed attention (Statements 1 and 6) and evaluation (Statement 2), since they account for 72.22% of effective listening comprehension (Graph 2).



Graph 2. The overall influence of metacognitive strategies on listening comprehension

Discussion

The main aim of the present study was to look into the first-year tertiary-level students' cognitive and metacognitive strategy using habits in listening comprehension. The attitude of university lecturers as decision-makers at the tertiary level of education is of utmost importance for a course design. Thus, the study took into consideration their opinion on cognitive and metacognitive strategy utility.

Language knowledge test results pointed to a rather low level of the subjects' language knowledge. Namely, after acquiring English as a foreign language for twelve years, a large number of students is still at A level, whereas they are supposed to finish the chosen secondary school with B2 level English knowledge. This may be attributed to insufficiently developed individual learning styles and either the lack of strategy use or their ineffective employment. However, regardless of the main source contributing to such conditions, they could be described as rather disadvantageous, having in mind the importance of the English language for the future profession of tourism students, which will imply intense encounters with foreigners.

The results pointing to the cognitive behaviour of the group of skilled language users showed these strategies to be used with high degree of preference. Such a result would further imply that this group of

subjects is actively involved in mental processing of language. The group of skilled language users also proved to be more prone to using cognitive strategies compared to the group of less skilled ones who can be described as moderate cognitive strategy users. The finding could be said to be expected as some previous research has confirmed the strong positive relationship between cognitive strategies and English proficiency (Wu, 2008).

Though both groups of subjects use bottom-up and top-down mental processing in incoming speech comprehension, the group of skilled language users relied to a higher degree on top-down processing. It means that the use of the background knowledge, i.e. prior knowledge of the world and/or context in message interpretation are predominant, whereas the linguistic features of the text are used, but to a lesser degree. These findings are in line with Graham (2017) and Chamot (2004). It would be interesting to note that the use of bottom-up and top-down processing is more balanced with the group of less skilled language learners. Such a result testifies to the fact that when faced with listening task, less skilled language users become overwhelmed with senses. A constant inflow of input information, i.e. incoming sounds prevents them from activating top-down processes. Namely, by focusing their attention to surface details, they become blocked from reaching in-depth understanding. Having in mind the necessity of using listening comprehension and speaking skills in everyday business communication of tourism professionals, the need for conscious work on developing listening comprehension becomes even more urgent.

As far as metacognitive strategies are concerned, the skilled language users showed the preference to use them with high frequency. It means that this group exhibited high involvement in controlling their listening comprehension process by focusing their attention, monitoring and identifying problems they encounter while listening. According to the attained results, the group of less skilled language users could be described as moderate metacognitive strategy users. Namely, the rates given to the tested metacognitive strategies coincide with the ratings obtained by the skilled language users, but the averages are lower. The findings are contradictory to those obtained by Khalil (2005) and Goh (2002), who report that the increase of language level positively influences the variety of the strategies used. The frequency of the least used metacognitive strategy (problem identification) by the less skilled language users pointed to the low-level frequency. The remaining strategies were ascribed a medium or high degree of preference. Such results point to the fact that both groups of subjects put great importance to managing their listening comprehension process. However, the less skilled language users showed a poor ability of identifying problems in listening comprehension, which can be attributed to the fact that they are aware of this strategy, but it remains beyond their ability to use it regularly while listening. Another metacognitive strategy rated below 3.0 is evaluating the listening comprehension process. As highly rated strategies mostly concerned monitoring and focusing attention, it could be concluded that the incoming information in the process of listening comprehension was processed at the surface level by the group of less skilled language users. In general, this confirmed the results achieved so far, testifying to the fact that strategy use depends to a certain degree on the user's language level. In general, for both cognitive and metacognitive strategies, it can be said that the range of the chosen strategies does not differ, but the frequency of use influences the noted distinction.

The obtained results show that the university lecturers maintain global prediction, personal or world elaboration and inferencing to be three most useful cognitive strategies, whereas reorganising and note taking are described as the least useful ones. The choice of the most useful strategies confirms the results obtained in the previous research (Vandergrift, 2003). However, the fact that two least rated strategies would burden students in the process of listening comprehension with additional cognitive load, might be the reason they remained at the bottom of the utility list. As regards the utility of metacognitive strategies, monitoring, directed attention and evaluation is also the choice confirming the previous findings (Vandergrift et al., 2006). Rating constant monitoring, i.e. active thinking of whether comprehension takes place, as the least useful metacognitive strategy is in line with some previous findings which report on this strategy being the least used one in the process of listening comprehension (Yang, 2009).

The set of most beneficial strategies attained by all subjects, the students and lecturers, comprises the cognitive strategies of linguistic inferencing, global prediction and academic and world elaboration, which is in line with Vandergrift (2003). It means that the use of context and prior knowledge as well as general meaning of the text are found to be most beneficial to incoming speech decoding. As for metacognitive strategies, monitoring, directed attention and evaluation came to the fore, which confirms Vandergrift et al. (2006). Furthermore, such results are partially consistent with the results reported by Al-Qahtani (2013), who found that inferencing, elaboration and translation as cognitive strategies, i.e. directed attention and monitoring as metacognitive ones, were most utilised strategies among university student population.

Conclusions

The present study was aimed at looking into the cognitive and metacognitive strategic behaviour of freshmen university students as well as university lecturers' attitude towards strategy utility in the context of listening comprehension in second language acquisition. It is important to gain the insight into the learning habits of first year students as it would enable ESP lecturer to fine-tune the instruction to the needs and abilities of the group. On the other hand, the university lecturers were included into the study in order to decrease the level of subjectivity of a single lecturer as decision maker when it comes to listening strategy choice. Hence, one of the expected results of the study was to identify the set of preferable strategies as defined by students and lecturers which, implemented into the classroom instruction, would lead to improving listening comprehension and in such a way contribute to more efficient acquisition of a foreign language.

Past research has demonstrated that skilled language learners are also skilled strategy users. However, the attained results of the current study have shown that there is no significant difference in strategy type preference between skilled and less skilled ESP learners at the beginning of their studies. What makes a difference is the average they use to describe the degree of preference. Thus, the rating of the observed strategies differs. The ESP lecturers' utility rating points to prediction, elaboration and inferencing to be top three cognitive listening comprehension strategies, which coincides with skilled language users. As far as the utility of metacognitive strategies is concerned, monitoring, directed attention and evaluation proved to be most beneficial.

The identification of the set of preferable strategies of skilled and less skilled students pointed to deficiencies in strategic behaviour of the observed student population. Consideration of the set of preferable strategies and those bearing the highest level of utility provided the identification of the strategies that should be included into foreign language instruction – linguistic inferencing, global prediction and academic and world elaboration as cognitive strategies, i.e. monitoring, directed attention and evaluation as metacognitive ones, respectively. Moreover, they are expected to contribute to a more efficient course delivery (having in mind the improved comprehension while listening which would further lead to a more efficient language acquisition) and, additionally, they would most beneficially contribute to building student autonomy and independence, which proved to be essential for studies at a university level (Little 1991, Chamot 2005; Pešić 2017b).

However, there still pertains the impossibility to generalise the attained results for the groups of skilled and less skilled language users. The reason might be due to the fact that in order to generalise conclusions, it is of vital importance to take a holistic approach to strategy use analysis. However, the individual differences of students play significant role when it comes to strategy choice, which makes it impossible to neglect them. One of the possible solutions may be a try to bring together the results of research into strategic behaviour of native speakers to those of non-native ones. Such comparative research might bring about some new insights into a desirable strategic behaviour in the process of listening comprehension.

Another point to be made refers to the employment of a questionnaire as a research tool. Namely, besides being a measuring tool, it can also be used for raising students' awareness of strategic behaviour by introducing them to different types of strategies that can be used in the process of learning, i.e. language learning and listening comprehension development in the context of the current study.

Despite its value, the study has certain limitations. First, it is the sample size. Apart from taking into consideration different-year students, it would be interesting to include a larger number of university lecturers, including those teaching at philology universities. Second, the orientation of studies can also be taken as one of the deficiencies. Namely, besides considering the behaviour of the students at social academic studies, it would be interesting to look into strategic behaviour of those studying sciences. Moreover, qualitative research methodology would add additional value to the study by providing deeper data on strategy use. Further research would be necessary to bring about information on strategy use during the course of listening.

Conflict of interests

The author declares no conflict of interest.

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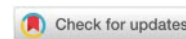
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Psychological Well-Being as Cognitive-Emotional Component of Student Self-Regulated Learning

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Abstract: The manuscript reports the theoretical aspects of studying the concepts of students' psychological well-being in the process of self-regulated learning. The essence of student psychological well-being through a prism of cognitive and emotional personality factors has been theoretically studied. The role of psychological well-being and its components in the process of self-regulated learning activities of HEI students has been described. Psychological well-being has been viewed as an integral indicator of the level of personality, which affects resistance, and manifests itself in subjectively tangible satisfaction and life satisfaction. Self-regulated learning has been considered as a metacognitive level of initiation, motivation, monitoring, evaluation and control of all kinds and forms of internal and external activities by the subject of learning, which are aimed at reaching the predetermined goals of learning, personal and professional self-development and self-realization. The results of empirical research with the use of K. Ryff's questionnaire entitled "Scales of Psychological Well-being," as adapted by S. Karskanova, allowed us to evaluate personal growth, positive relationships with others, goals in life, managing environment, autonomy and self-acceptance which are indicators of individuals' psychological well-being. Methods of statistical data processing such as descriptive statistics (group median - Me, arithmetic mean - M, standard deviation - σ) and the Kruskal-Wallis test, confirmed the existence of a statistically significant linear age-related decrease in indicators on the "Autonomy" Scale for the senior students. Analysis of the empirical data on the levels of defined psychological well-being has showed a linear correlation between psychological well-being and its levels. It has been concluded that the cognitive-emotional aspects of psychological well-being of modern student youth in learning activities have been dominated by dependent types of self-regulation in learning. The results have indicated that the most appropriate means to improve the psychological well-being of students, as a component of the emotional and behavioral level, is the formation of their active life position, responsibility for their own activities, motivation and autonomy in self-regulated learning activities. Prospective directions for future research have been described.

Keywords: cognitive-emotional factors, learning activity, psychological well-being, self-regulated learning, student.

Introduction

One of the most relevant indicators influencing the formation of the future professional is the psychological well-being of the individual, which is perceived as an integral indicator of the level of personality affecting resistance and manifesting itself in subjectively tangible satisfaction and life satisfaction (Pavliuk, Shopsha and Tkachuk, 2018). It is believed that this phenomenon affects all aspects of human life, including the personal inclination toward self-actualization and self-development, as well as life satisfaction and the realization of personal choices (Kashliuk, 2016).

Experiencing a sense of satisfaction with one's own activities based on personal experience is an important component of an individual's psychological well-being, along with such components as a positive cognitive-evaluative attitude toward the world in general and toward themselves as the subject of life activity. Personal aspects of individual psychological well-being has been studied by Arshava and Nosenko (2012) defining it as the positive cognitive-evaluative attitude of a person toward the surrounding world and toward themselves as the subject of life, as well as the personal feeling of satisfaction with their activities. Therefore, based on general theoretical approaches to determining the structural components of psychological well-being, we can elaborate on their significance in the implementation of students' self-regulated learning activities. These components include: an emotional component (a positive or

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negative attitude in the implementation of educational goals, needs and intentions) (Arshava, Znanetska and Nosenko, 2011); a cognitive component (a student's assessment of their student life, satisfaction with it as the main indicator) (Balashov, 2020); and a conative component (a set of functional components that ensure the positive functioning of the individual, such as autonomy, focus on personal growth, positive relationships, self-acceptance, life goals, etc.) (Kashliuk, 2016).

The issue of the study of individual psychological well-being of a student in context of their cognitive and emotional spheres is critically relevant due to the insufficient level of generalization and development of methods for studying this issue with regards to self-regulated learning. This topic is especially relevant in the context of studying the learning activities of students in the context of their learning efficiency and success. Setting the own learning goals, learning educational material, performing the learning tasks, formative assessment, analysis and correction of the own learning activities requires activation not only of cognitive processes of students, but also includes their emotions which allows analyzing the learning methods and strategies, and, if necessary, correcting them. An important factor influencing success is the students' ability to self-regulate the learning process, which plays a significant role in their learning activities. Given that students' metacognitive abilities and learning motivation largely determine learning efficiency and success, we find it significantly relevant and appropriate to study the relationship between the cognitive and emotional components of students' psychological well-being and their self-regulated learning.

A large number of scientists have carried out the study of self-regulated learning and psychological well-being of students. New areas of research in psychology and the attitude toward the individual as the highest value have presented scientists with the task of determining the mechanisms and factors of successful fully-fledged personal life in society. In modern psychological science, the concept of well-being has a variety of definitions, including: well-being based on virtue, the definition of the true "I," individual self-realization and professional growth. Most often in the theoretical works of scientists we come across the definition of well-being as a set of certain personal qualities or states, or the study of one of the criteria of well-being. Individual achievement of psychological well-being is often seen as a process of forming such individual qualities or states, as well as being the result of this process (Leontyev, 1992).

The assessment of a person's life, its individual parts and characteristics is based on cognitive-emotional experience, which is formed on the basis of the subjective perception of the surrounding circumstances, taking into account the individual's personal characteristics. This assessment can be considered a determinant of subjective well-being, the concrete embodiment of which is the psychological well-being of the individual. Psychological and subjective well-being in the context of objective and subjective characteristics of the phenomenon of well-being have also been distinguished by some scientists (Leontyev et al., 2007).

Psychological well-being is a complex integral phenomenon that includes a number of components. Cognitive and emotional (affective) components can be distinguished. It is understood that a person's positive or negative emotions, their mood, emotional balance, etc. determine the emotional and behavioral component of psychological well-being. Moreover, its cognitive component is manifested in a person's ideas about their own life and its comparison with the imaginary ideal life, which in turn is crucial for overall life-satisfaction or its specific parts and the projection of self into reality (Balashov, 2020).

To a large extent, youths' psychological well-being is influenced by the level of formation of the system of behavioral self-regulation and their own motivation (Golovey and Rybalko, 2002; Ryan and Deci, 2001). Motivation of student learning activity includes a number of factors which determine the level of self-regulation. We share the views presented in the theory of self-determination (autonomy) by Ryan and Deci (2001). In this theory, the scientists distinguished the extrinsic or external motivation, when behavior and activities are determined by rewards and punishments; introjected motivation, in which behavior is determined by the set rules and requirements; identified motivation, when behavior is determined by a sense of personal choice, previously regulated from the outside; and intrinsic or internal motivation, when the students show interest in this activity. Students' academic efficacy can be predetermined, according to this theory, by intrinsic motivation, which has been based on the student's need for competence (choosing the optimal task difficulty, positive feedback) and self-determination (autonomy, internality of personality) (Ryan and Deci, 2001). Comprehensive research examining the correlation between psychological well-being and the self-regulation of student learning activities is lacking (Balashov et al., 2018, p. 1-22).

Psychological well-being as a holistic subjective experience is of great importance for a person, because it is associated with basic human values and needs, as well as with everyday concepts such as happiness, a happy life, life satisfaction etc. In this situation, a person emphasizes their own subjective emotional assessment of their own life, as well as aspects of self-actualization and personal growth. These two aspects were successfully synthesized and characterized in the six-component theory of

psychological well-being by Ryff (1989), who substantiated the phenomenon of a person's psychological well-being as the perception and evaluation of their inner functioning in terms of reaching the peak of human potential. Improving a person's quality of life and reducing their fear of aging were considered signs of well-being. The author considered a psychologically prosperous person to be one who is self-realized and whose needs were met (Ryff, 1989).

Components of psychological well-being can be viewed in Ryff (1989) structure of the components of this phenomenon, which contains six separate scales of psychological well-being of the individual. This combination included characteristics such as: well-being, which combined a positive assessment of themselves and their past (self-acceptance); a sense of constant personal growth and development (personal growth); the belief in goals and meaning of life (purpose in life); quality relationships with others (positive relationships with others); the ability to take responsibility for their own life and the world around (mastery of the world around); and a sense of personal self-determination (autonomy) (Balashov, 2020).

Self-acceptance is a phenomenon that determines a person's positive attitude toward themselves, conscious evaluation of previous life experiences, and acceptance of their own positive and negative individual characteristics. According to Ryff (1989), positive relationships with others indicate the presence of empathy, the ability to find compromises with others, trusting relationships with others and feelings about one's own well-being. Autonomy characterizes the level of the person's independence in society, their ability to reflect on and regulate their own behavior, self-assessment in terms of their own value sphere, and ability to effectively use life circumstances to create opportunities. The characteristics of environmental management explain the level of personal confidence and competence in the effective management of daily affairs, the self-creation of conditions for the realization of one's own needs and values. The "goals in life" scale characterizes the presence of the person's life orientation, life goals, and their meaningful implementation. The personal growth of the subject refers to their continual self-development and self-improvement, learning from new life experiences and the desire to reach their full potential in life.

People with a low level of psychological well-being do not have the experience of positive close relationships with others and, therefore, have a constant need to find resources to improve this type of well-being. They constantly expect a positive attitude towards themselves from others, but are afraid of being unacceptable in different groups. They mostly have a negative emotional background and underdeveloped self-control. According to them, the socio-cultural environment is mostly unfair and is threatening to them.

Individuals with an average level of psychological well-being focus mainly on controlling the external environment, but at the same time seek to develop their own competence. This, in turn, increases the level of psychological well-being. Such individuals are mostly overly focused on the socio-cultural environment, idealizing others. They usually have a negative emotional background, and they mostly focus on a small circle of communication, even at the cost of personal changes that are harmful to their personal development. Individuals, who are characterized by a high level of psychological well-being, have constructive relationships with others, personal harmony and a high level of personal reflexivity. They are resistant to stress, are more socially adapted and have a developed ability to internally overcome interpersonal conflicts (Balashov et al., 2018).

According to Pozdniakova (2007), the personal experience of feeling well-being includes the cognitive component of life satisfaction and depends on the presence of a person's stable positive emotional background and a positive subjective assessment of reality. It should be borne in mind that the level of psychological well-being depends on whether or not the needs of different levels are met. This includes social needs because a person's motivations include the desire to belong to a social group (community) and occupy a certain place in this group, have good relations, the attention of others and be the object of their respect and love.

In regard to student learning, it is especially important to determine the relationship between psychological well-being and self-regulated learning. In the context of this study, we consider self-regulation as "the systemic process of integrating an individual's motivational sphere in accordance with the holistic "I" and the available opportunities, as well as a set of means to initiate, program and control actions to implement these products of motivational integration into self-regulated learning activities" (Balashov, 2020, p. 98). Self-regulation in learning has been considered as a "metacognitive level of initiation, motivation, monitoring, evaluation and control of all kinds and forms of internal and external activities by the subject of learning, which are aimed at reaching the predetermined goals of learning, personal and professional self-development and self-realization" (Balashov, Pasichnyk and Kalamazh, 2021).

The main goals and purpose of our study was aimed at helping to improve the understanding

of students' psychological well-being through the possible impact on their system of self-regulation in learning, as well helping to identify the optimal quality of cognitive-emotional factors of self-regulation for psychological well-being. We aimed to determine the cognitive-emotional characteristics of psychological well-being in student self-regulated learning.

Materials and Methods

In the study, we relied on K. Ryff's definition of psychological well-being, in which it was considered as a basic subjective construct that reflects the perception and evaluation of its functioning in terms of human potential, including the following parameters: positive relationships with others (trust and care for them, empathy); autonomy (independence from social pressure and self-regulation); competence in managing the environment (the presence of control, the ability to choose and create situations that meet one's own needs and values); the presence of life goals; and personal growth (belief in one's own ability to reach one's personal potential) (Ryff, 1989). K. Ryff's questionnaire entitled "Scales of Psychological Well-being," as adapted by S. Karskanova, allowed us to evaluate personal growth, positive relationships with others, goals in life, managing environment, autonomy and self-acceptance which are indicators of individuals' psychological well-being.

The research sample consisted of 526 first-year ($N = 263$) and fifth-year ($N = 263$) students at the National University of Ostroh Academy ($M = 20.2$; $SD = 1.97$). The study was conducted and empirical data was collected during September-December, 2021. The sample was formed by a spontaneous method from the full-time students. To evaluate the level of students' psychological well-being, we used K. Ryff's "Scales of Psychological Well-being" as adapted by S. Karskanova, which consists of six scales: personal growth, positive relationships with others, goals in life, environmental management, autonomy and self-acceptance. These scales are indicators of the psychological well-being of the individual. The questionnaire consisted of 84 statements, for each of which the answer options are from 1 ("Absolutely disagree") to 6 ("Absolutely agree") (Karskanova, 2011). In addition, the following methods of data processing were used: qualitative - methods of analysis, synthesis, comparison and generalization to compare the data with other studies in this direction and interpret it; quantitative - methods of statistical data processing; descriptive statistics (group median - Me , arithmetic mean - M , standard deviation - σ); the Kruskal-Wallis test; and Fisher's F-Test. The statistical program SPSS 15.0 was used for statistical data processing.

The accuracy and validity of the research conducted was ensured by representativeness of the sample, the use of the method relevant to the topic, aim and tasks of the study, the use of quantitative and qualitative analysis of the received empirical data by using the following methods of mathematical statistics.

Results and Discussion

Table 1 presents the descriptive statistics of the junior students' diagnostic results according to K. Ryff's questionnaire "Scale of Psychological Well-being."

Among the indicators of psychological well-being in the study group of students, the highest results have been noticed on the scales "Personal Growth" and "Self-Acceptance." This means that the studied junior students are quite open to new experiences, have a sense of reaching their potential and continuous development. They are quite positive about themselves in learning and accept different aspects of their personality. However, the lowest indicators on the scale "Environmental Management" have indicated that respondents are not sufficiently competent in managing the environment and controlling their external activities. They do not use opportunities, conditions and circumstances to achieve goals. Attention has been drawn to a zone for development by the indicators of autonomy, positive relationships and goals in life.

Table 1

Descriptive statistics of evaluation of junior students' characteristics of well-being according to K.Ryff's "Scale of Psychological Well-being"

	Me	M	σ	Sten score
Personal growth	62,44	61,50	12,00	6
Goals in life	59,50	60,08	11,60	5
Self-perception	59,30	57,53	11,87	6
Positive relationships	56,68	56,84	10,88	5
Managing environment	53,78	53,55	10,68	4
Autonomy	53,30	53,12	10,88	5

Note: descriptive statistics (group median - Me, arithmetic mean - M, standard deviation - σ)

Student autonomy is associated with: confidence and competence in the management of daily affairs; the ability to choose and create conditions that meet individual and personal needs and values (competence, environmental management); the ability to withstand environmental pressures; and the ability to regulate their behavior and self-esteem based on their own beliefs or values. According to the results of our study, this has a relatively smaller impact.

It should be noted that the need to develop this characteristic in terms of self-regulated learning is important, as a person with high autonomy is able to be independent, is not afraid to oppose the opinion of the majority and can allow in themselves non-standard thinking and behavior. The lack of a sufficient level of autonomy leads to conformism and excessive dependence on the opinions of others.

To determine the dynamics of cognitive-emotional indicators of students' psychological well-being in terms of self-regulated learning, the entire sample was divided into groups according to the year of study. Graphically the results are presented on Fig. 1.

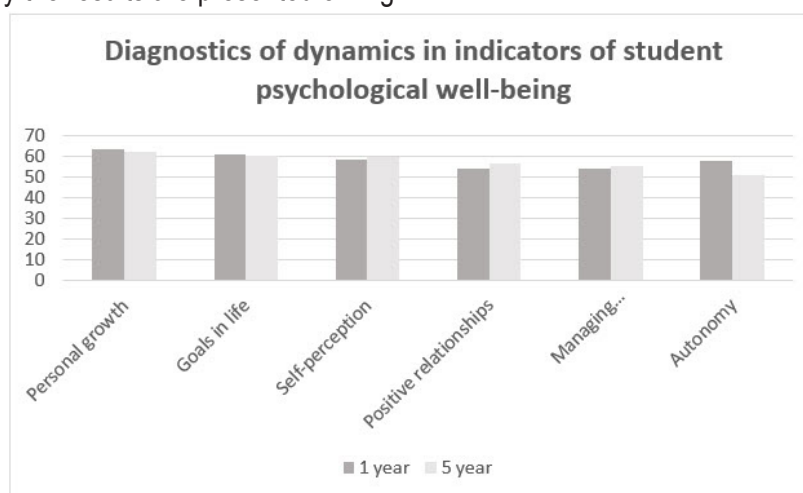


Figure 1. Diagnostics of dynamics in indicators of student psychological well-being according to K. Ryff's "Scale of Psychological Well-being"

The groups were compared by the method of variance analysis to check the differences in the expression of qualities on the scales of psychological well-being. The Kruskal-Wallis test confirmed the existence of a statistically significant linear age-related decrease for the 5th year students by the indicator on the "Autonomy" Scale ($p \leq 0,01$) (Table 2).

Table 2

Results of diagnostics of dynamics in indicators of student psychological well-being according to K. Ryff's "Scale of Psychological Well-being"

	Me (group) Year		Kruskal-Wallis criterion	
	1	5	χ^2	P
Personal growth	63,12	61,92	1,02	0,570
Goals in life	60,75	59,90	3,14	0,176
Self-perception	58,50	59,16	3,68	0,144
Positive relationships	53,90	56,12	0,266	0,780
Managing environment	53,66	54,80	0,490	0,764
Autonomy	57,68	50,90	8,902	0,008

The results of correlation analysis based on the obtained empirical data have shown the direct or inverse correlation of psychological well-being of students in learning with its levels. Students' skills such as motivational management, which is the ability to set important goals and implement them, are important for the development of psychological well-being in the process of self-regulated learning. Personal indicators such as positive relationships and self-acceptance have also been identified as important for the senior students.

Analysis of the empirical data on the level of defined psychological well-being has shown the linear nature of the correlation between psychological well-being and its levels. It is evident that the development of self-regulated educational activities requires certain educational conditions that characterize psychological well-being and determine it in the learning process.

Theoretical analysis of different approaches to the determination of the phenomenon of psychological well-being in self-regulated learning enabled the identification of the main components and factors of psychological well-being. Among them are: life satisfaction as an integral cognitive-emotional assessment; functional status - mental and psychophysiological state, i.e. the absence of negative experiences, states that have negative consequences for the body and psyche in learning activities (Pozdniakova, 2007); the value-motivational sphere as the general awareness of life and individual coordinate system of priorities; the ability to use available opportunities to achieve significant goals, as well as the overall consistency of needs and opportunities (Ryff and Keyes, 1995); social well-being which requires social support, openness in relationships, the absence of conflicts and a favorable social environment; self-esteem, including confidence in one's own abilities to overcome negative circumstances, take personal responsibility for one's own learning activities, and the absence of internal conflict; and self-efficacy, the achievement of certain learning goals and the presence of meaningful learning prospects (Kashliuk, 2016).

The theoretical analysis of the aspects of personal aspirations in our study has shown the balance between adaptation as an adjustment to the requirements of society, and self-realization as the embodiment of their potential, i.e., the most effective use of all the forces, abilities, skills and other resources in their self-regulated learning. Actually, this supports the thought that such balance determines whether a person feels psychologically and emotionally well during learning activities (Kashliuk, 2016).

Our theoretical results are similar to findings of Grigoryeva's (2009) scientific theory, in which it has been shown that neither the level of physical health, nor material well-being, nor satisfaction of the set needs are directly associated with experiences of happiness and well-being. Real prosperity involves the perception of life, a subjective attitude toward the situation and to one's own capabilities, and a sense of self-realization of one's own potential in learning and professional activity. It is also fair to assume that different components of well-being will be combined differently and have different meanings depending on the individual, profession and other factors (Balashov, 2020). The empirical data has made it possible to find a correlation between psychological well-being, and a positive relationship with friendliness ("positive relations" scale), and openness to new experiences ("goals in life" scale), which confirms the existing studies on this problem (Lamers, 2012).

Keyes (1998) assessed the level of psychological and social well-being in terms of signs of a person's sense of comfort in the surrounding environment, confidence in their own ability to self-actualize, perception of their social environment and the feeling of being a part of it, which allows their contribution to this environment. The social and emotional dimensions of well-being are reflected in its five-factor structure, elements of which have been analyzed and assessed in our current study.

Among these factors is social acceptance. Individuals with developed social acceptance trust others, recognize their diligence and kindness, have a positive attitude toward human nature and feel comfortable among others. Social acceptance is a kind of social analogue of self-acceptance, which has

been explored in our study and is true for student self-regulated learning.

Self-actualization is another factor that is important for psychological well-being, which involves the assessment of learning potential and trajectory, social responsibility, which is realized through social institutions and civil society, etc. Socially healthy individuals feel responsible for the development of society and their own self-actualization in it via learning and an active social role.

Consistent with the learning environment, is the perception of quality, organization and the students' active participation in creating their own learning environment. Psychologically well students understand the essence of the processes occurring in the learning environment. Such individuals do not mislead themselves about the fact that they do not live in an ideal world. The adequate perception of social and education realities stimulates their search for the meaning of life in the real world and relevant self-regulated activities in learning. The personal contribution and growth of students is reflected in the assessment of their values and dynamics in personal development. Being a vital member of the educational environment, feeling confidence in one's own values and clearly understanding one's own learning goals make student self-regulated learning and its motivation more autonomous (internal), efficient and conscious.

Today, many scientists have focused on exploring the different cognitive and metacognitive factors determining the quality of psychological well-being in self-regulated learning (Savchenko, 2016; Radchuk, 2015; Voloshyna, 2014; Balashov, Pasichnyk and Kalamazh, 2021). Our current theoretical analysis and empirical data have supported the conclusion that the definition and analysis of cognitive and emotional aspects of students' personal well-being in self-regulated learning can be an effective tool for university professors who should consider the individual characteristics of every student and properly build their activities to improve the learning process. This is especially important as we consider students to be subjects of their own cognitive and metacognitive learning activities. Such conclusions support the previous studies of Brown, Andrade and Chen (2015), Schunk and Greene (2018), Andrade and Heritage (2018) and Balashov, et al. (2018), who emphasize the importance of psychological well-being in increasing the efficiency of student self-regulated learning, and consider academic self-regulation, the psychological and emotional well-being of students at higher educational institutions as a factor of their academic motivation and learning self-efficacy.

Conclusions

Summarizing the results of theoretical analysis and the empirical evaluation, it can be concluded that the cognitive-emotional aspects of psychological well-being of modern student youth in learning activities have been dominated by dependent types of self-regulation in learning. Students with external self-regulation are primarily described by a passive subjective position in their own learning. Introjected self-regulation determines that students rely on the instructions of teachers in learning and their emotional dependence on such instructions increases. Students with predominantly identified self-regulation are proactive, confident, independent and they create their own behavioral paths. The autonomous (internal) type of self-regulated learning supports the development of students' cognitive and metacognitive abilities, their creativity, self-organization and active subjective attitude toward learning, which leads to an increase in their level of psychological well-being.

Theoretical analysis and empirical research have confirmed the close relationship between the psychological well-being of students and the indicators of the levels of psychological well-being studied. Empirically, it was found that students' "autonomy" significantly decreases with the transition to their senior year of studying. The number of highly autonomous students during their studies does not significantly change statistically. Among the factors of psychological well-being, the highest indicators were "personal growth" and "goals in life", and the lowest – "environmental management" and "autonomy". Autonomy and the ability to manage the environment are deep personal formations, the preconditions of which were laid in early childhood under the influence of meaningful relationships.

Modern higher education has been designed to ensure equal access to the best educational resources and practices for all participants in the educational process, and ensure the formation of an intelligent, competent and competitive professional in the labor market. In order to prepare a student to function in such conditions, academic knowledge, functional skills, personal and communicative-organizational competencies are not sufficient. It is necessary to develop their completely new personal characteristics, such as emotional, cognitive and metacognitive skills and competencies. The study emphasizes that the most appropriate means for improving the psychological well-being of students, as a component of the emotional and behavioral level, is the formation of their active life position, responsibility for their own activities, and autonomy in self-regulated learning activities.

It is especially important to determine the relationship between psychological well-being of students and their academic performance. This will help develop metacognitive components of student learning that increase efficiency of such academic performance. Determining the right balance of student learning motivation and personal factors crucial for successful student learning activities is one of the most topical issues of modern higher education and is seen to be the prospective direction for the future research.

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Conflict of interests

The author declares no conflict of interest.

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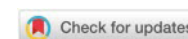
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Encouraging Self-Regulated Learning in Kindergarten

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Abstract: This paper presents a part of the research carried out among educators in Slovenian kindergartens on the self-regulated learning of children in kindergarten and the role of educators in this process. The aim of the research was to find out how educators self-assess their knowledge of self-regulated learning in relation to their level of education, workplace (educator and assistant educator), and work experience. The research was conducted in June and July 2021 via the 1Ka website for online surveys. The questionnaire was sent by e-mail to the kindergarten directors throughout Slovenia. One-way analysis of variance indicates that there are no significant differences on the scale of knowledge about self-regulation and self-regulated learning in relation to the level of education, $F(4, 494) = 0.96, p > 0.05$. One-way analysis of variance indicates that there are statistically significant differences on the scale of knowledge about self-regulation and self-regulated learning in relation to work experience, $F(3, 495) = 3.20, p = 0.023$. LSD post hoc test was applied to examine the differences between individual groups. Educators and assistants with more than 31 years of service ($AS = 3.62$) have significantly higher results on the scale compared to those with up to 10 years of service ($AS = 3, 40$). as well as in relation to those with work experience from 11 to 20 years ($AS = 3.39$). Educators and assistants with more than 31 years of service ($AS = 3.62$) have significantly higher results on the scale compared to those with up to 10 years of service ($AS = 3,40$).) as well as in relation to those with work experience from 11 to 20 years ($AS = 3.39$).

Keywords: child, educator, kindergarten, self-regulation, learning.

Introduction

In Slovenia, the topic of this research has not been investigated when talking about the self-regulated learning of children in kindergarten, but certainly, there is some research on the self-regulated learning of primary school pupils, high school students, and students at universities (Belfi et al., 2012; Boekaerts and Corno, 2005; Cleary and Zimmerman, 2004; Lončarič, 2014; Pintrich, 2004; Zimmerman, 2002, etc.). In this research, foreign investigations in the USA, Australia, and Europe are in focus of attention. Interest in self-regulated learning processes began in the mid-1980s, when researchers sought an answer to the quest of how children and students become masters or experts in their own learning process. Self-regulated learning is a cognitive-constructivist paradigm of learning and teaching activity that emphasizes the active role of the child or student in the learning process, in which he/she becomes a co-creator of his/her learning process with the professional and thoughtful support of a competent educator. The results of relevant research show that children from the age of four are capable of self-regulated learning with the appropriate support of adult. Children develop at the fastest rate in their lives from birth to the age of six. This is a period of vulnerability and great opportunity. In the second year of life, they show a desire for independence and decision-making. There is a well-known saying in the professional public: "Help me to do it alone", written by Montessori (2003), and then the notion of self (I) appears. Early development takes place in stages, from complete dependence on others to acquiring the ability to adapt to the world to their needs. Important tasks of educators in the process of children's education in kindergarten are creating conditions for their learning and providing indirect support in various activities in the learning process, whereby children are not deprived of authorship over this process (Slunjski, 2011, p. 225). In the field of early and preschool education, there is not much research on self-regulated learning of preschool

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children to find out about the role of educators in this process, although experts believe (Bodrova and Leong, 2008; Sezgin, 2016; Torres, 2011) that encouraging self-regulated learning in early childhood makes sense. The role of educators in the process of promoting learning at the preschool level is much greater than can be expressed by research figures. The cornerstone of teaching and learning is the relationships that emerge and are created between educators and children during teaching and learning. Mutual knowledge acquired during the implementation of activities is the key to success in teaching and learning (Postman and Weingartner, 1969). Ayers (1993) and Noddings (1997) emphasized the view that learning and teaching through interpersonal relationships promotes lifelong learning and productivity. Educators' responsibilities include preparing, organizing, and implementing educational activities, as well as working with parents and participating in the organization of kindergarten life. It is important that activities are planned based on a thorough knowledge and understanding of the child's development and needs. The educator chooses the appropriate content, forms, and methods of work. He/She also directs the educational process, organizes and leads children's activities and prepares didactic material. In doing so, educator encourages, guides, and plays with children. According to the Slovenian Qualifications Framework (graduate educator of preschool children, 2021), an educator has general and subject-specific competencies. General competencies include:

- analysis and synthesis and prediction of solutions and consequences,
- application of knowledge in practice,
- development of critical and self-critical judgment,
- communication and teamwork,
- initiative in the process of lifelong learning,
- sensitivity to the environment, cultural and national identity,
- planning and implementation of activities,
- understanding the individual, his values, and value systems.

In the process of teaching kindergarten children, the educator helps them become more conscious of their own thoughts and learning, as well as explore new ways to learn (Bruner, 2000). Awareness of the self-learning process enables children to take responsibility and control over the process (Kinsler and Gamble, 2001). Various forms of educator support for children in the research learning process are described by Barth (2004) as a process of information exchange and discourse based on open and stimulating inquiries relevant to the subject that the children are researching. Educators' intentional work in early childhood to promote self-regulation helps children acquire critical abilities such as control methods, problem-solving strategies, environmental responsibility, and emotional control.

The quality of the upbringing and education of preschool children largely depends on the effectiveness of the learning and teaching process (EACEA/Euridice/Eurostat, 2014). Social and emotional competence, together with self-regulation, intrinsic motivation to learn, and the ability to cooperate with other students, can help a child when the need arises for self-regulation of learning, problem solving, and independent and group work. Therefore, one of the main challenges of preschool education is the design and implementation of a curriculum that equally develops these skills and competencies (Lesman, 2009). Learning how to learn includes awareness of the learning process and the need to identify available opportunities, as well as the ability to overcome one obstacle after another towards successful learning. This ability means acquiring, processing, and adopting new knowledge and skills, and seeking and applying new guidelines. Learning to learn encourages children to build on previous learning and life experiences and apply knowledge in a variety of situations: at home, at work, in further education and training. They organize their own learning, including effective time and information management, individually and in groups (Ur. L. EU, 2006; Ažman, 2012). Learning how to learn includes awareness of the learning process and needs, recognition of available opportunities, and the ability to overcome obstacles to successful learning. This ability means acquiring, processing, and applying new knowledge and skills, as well as seeking and applying guidance. Learning how to learn encourages children to rely on previous learning and life experiences and apply them and upgrade their knowledge and skills in different situations: at home, at work, in further education and training.

Recent research in the field of preschool education highlights the professionalism, competencies, and new role of educators as reflective practitioners and researchers (Gomerčič, 2022; Ljubetić, 2012b; Persson, 2006; Schleicher, 2013; Šagud, 2006; Taylor and Nolen, 2005). Preschool education is the first and initial phase of the education system, which includes children from the age of 11 months until they start school. The educator's job is to prepare the child for life, and he or she must be professionally trained to do so.

In educational practice, a competent educator acts in accordance with his or her professional identity, works on oneself to gain the essential information and abilities, and integrates newly acquired

knowledge into existing and useful in immediate educational work (Glasser, 1994).

Professional development should not be an embarrassment for educators, especially if they regard it as an opportunity rather than a need for advancement in their field. By doing so, they will be able to improve their professional efficiency, skills, and performance. The aspiration of educators for excellence in kindergarten should be considered a common practice. The most effective educators are those who are always looking for new skills and want to take them one step higher.

Self-Regulated Learning in Kindergarten

Play is the dominant practice of the child through which he/she builds relationships and through which the process of adoption and transformation of culture takes place (Shonkoff and Philips, 2000). The game is an "author's reworking of reality" and an act of imagining experience (Dahlberg, Moss and Pence, 2007). It is the same early expression of the deepest human quality - the capacity for flexibility, i.e., the form of expression of the most significant creative potential of the human being (National Curriculum for Early and Preschool Education, 2014). These abilities, considered inherent only in human beings, are of key importance for the constant process of harmonization and transformation of pedagogical work with preschool children (Marjanović, 1987).

Zimmerman (1986) defines self-regulated learning as a process in which students are actively involved in meta-cognitive, motivational, and behavioral action. In addition, self-regulated learning is defined as a self-directed process during which students consciously plan and monitor their cognitive, behavioral, and affective processes (Zimmerman, 2002). Didactic components of independent learning are exhibited by one's own initiative in studying and accomplishing goals, or by displaying the desire to learn independently (Gojkov-Rajić et al., 2021). Such learning includes children's thoughts, feelings, situations, and behaviors designed to achieve their learning goals. Gojkov Rajić et al. (2021) states that self-regulation is not a simple and easy process, and that teaching staff has a major role in the transfer of control from teacher to student. Looking at all the above, we were interested in how educators perceive self-regulated learning in kindergarten, in preschool children.

Materials and Methods

This paper presents a part of the quantitative research conducted among educators in Slovenian kindergartens.

Goals and hypotheses

- to find out what the attitudes of educators are about their own role in encouraging children's self-regulated learning in kindergarten.

H: Attitudes of educators about their own role in encouraging children's self-regulatory learning in kindergarten differ in relation to the level of their education, length of service and position (educator-assistant educator).

Survey sample

The study involved 500 respondents, graduate educators and assistant educators, of which 491 (98.6%) were female educators. Regarding age categories, 124 respondents belonged to the category up to 30 years of age, 253 belonged to the category from 31 to 45 years, and 123 respondents were older than 46 years. Forty-nine respondents completed secondary vocational education; 77 respondents graduated from grammar school or secondary vocational and technical school; 76 completed a higher education program; 255 (over 50%) had a higher professional or university degree; and 42 had a Master's or specialization degree.

There were 207 respondents who had 10 or fewer years of service, 154 respondents who had between 11 and 20 years of service, 84 respondents who had between 21 and 30 years of service, and 55 respondents with 31 or more years of service. There were 315 preschool teachers, while 185 were assistant educators. Over four-fifths (N = 411) of respondents worked in state public kindergartens, while the rest worked in private kindergartens.

Instrument

Scales of self-regulation and self-regulated learning. Three scales were constructed in order to measure the familiarity of educators and assistant educators with the concepts of self-regulation and self-

regulated learning. In order to check the latent space of each scale, an exploratory factor analysis was carried out (further information can be found in the section Data Analysis and Results). All items are given on a five-point Likert scale (I do not agree at all / I completely agree).

1) Knowledge of Self-regulation and Self-regulated Learning (KSSL) consists of 10 items whose goal is to measure the knowledge of various aspects of self-regulated learning in educators.

2) Confidence in the Skills of Educators and Encouragement of Self-regulation (CSEES) consists of 15 items aimed at measuring the confidence of educators and assistant educators in their ability to adequately train children for further educational tasks, as well as increase their self-regulated abilities, and some items related to assessing the importance of self-regulated skills.

3) Attitudes towards Children's Independence (ACI) consists of 6 items whose content describes various claims related to children's independence and educators and assistants' belief that children can independently perform certain tasks.

Results and Discussion

An exploratory factor analysis was conducted using the principal axis factoring method in order to examine the latent space of the three scales on self-regulation and self-regulated learning. The assumption was that each of the three scales was one-dimensional, and the scales were divided into several subscales only when the Scree diagram indicated the multidimensionality of the scale. Items that did not have a saturation of at least 0.30 on any factor were excluded from further analysis. For all accepted scales, reliability was measured by Cronbach's alpha. For all further analyses, scales were reduced to a scale of 1 to 5 (average summary scores) for easier comparison and interpretation. In order to eliminate univariate outliers in the data, all variables that had univariate outliers ($z > |3.29|$) were winsorized.

In order to test the hypothesis, "Attitudes of educators about their own role in encouraging children's self-regulatory learning in kindergarten differ in relation to the level of their education, length of service and position" one-way analysis of variance was applied to examine differences in education (1. Secondary vocational education, 2. Grammar school and secondary professional education, 3. Higher education program, 4. Higher professional or university program, 5. Master's degree or specialization) and work experience (1. 0–10 years, 2. 10–20 years, 3. 21–30 years, and 4. more than 31 years of service), and the t-test for independent samples was applied to examine differences in relation to the job (educator or assistant educator). The dependent variable was the score on the subscales of confidence in one's skills and encouragement of self-regulation.

Educators' assessments of the relevance of skills and their perceptions of children's curiosity

In the case of "Do you generally notice that children in your group have a natural curiosity and willingness to learn what you teach them?" as many as 477 educators and assistants answered in the affirmative, and only 21 answered in the negative (two did not answer this question) (Figure 1). When it comes to assessing the importance of different skills that children master (Figure 2), the most important is the assessed skill of participation and socializing with their peers, where as many as 66% of educators rate the importance of this skill as the highest. Perceptive skills like holding a pen and following instructions are also extremely important.

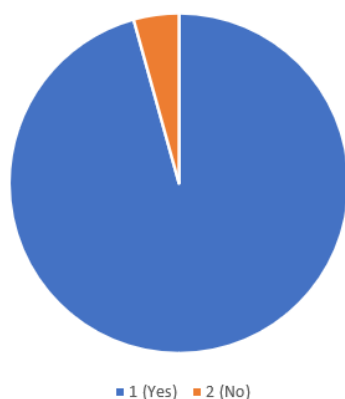


Figure 1. The answer to the question "Do you generally notice that the children in your group have a natural curiosity and willingness to learn what you teach them?"

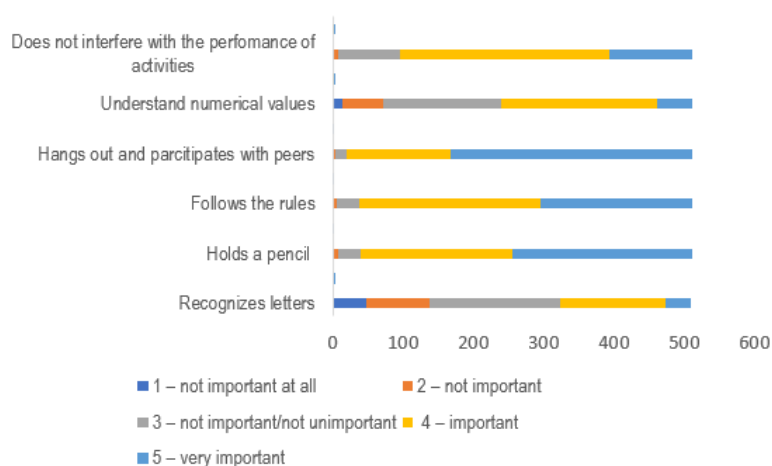


Figure 2. Assessment of the importance of different children's skills by educators and assistant educators

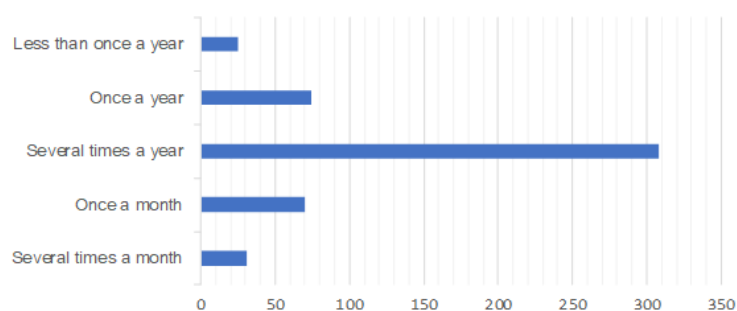


Figure 3. Participation in trainings related to professional development and knowledge of the concept of self-regulation

The answers related to the frequency of participation in training related to professional development are shown in Figure 3. Over half of the educators and assistant educators participate in additional training several times a year. Only slightly more than half of educators and assistant educators (N = 297) said they knew what self-regulation was.

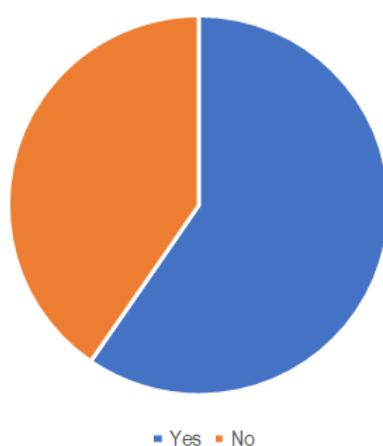


Figure 4. Are you familiar with the term "self-regulation"?

Factor analysis of the Knowledge on Self-Regulation and Self-Regulated Learning Scale (KSSL)

The factor structure is shown in Table 1. All items have a saturation factor of more than 0.30. The scale's reliability, as measured by Cronbach's alpha, was = 0.90, indicating excellent reliability.

Table 1
KSSL scale structure matrix

Item	Factor
Children with self-regulation challenges can be helped in various ways to establish self-regulation and self-regulated learning.	0.83
I know how to support children who have a good ability to self-regulate in various ways, so that their self-regulated learning continues to develop.	0.82
I know the types of factors that hinder a child's self-regulation and self-regulated learning.	0.78
I understand how self-regulation develops and how much self-regulation children should have at a specific age.	0.74
I know the difference between encouragement and praise and their impact on self-regulated learning.	0.71
I know how a child's self-regulation and self-regulated learning are related to other areas of development.	0.71
I know the factors that contribute to the development of self-regulation and self-regulated learning.	0.69
I think that a child's ability to self-regulate learning can vary depending on the days and the circumstances in the group.	0.60
I know that different social groups can influence children's self-regulated learning.	0.58
I think that self-regulated learning skills can change when children grow up.	0.44

Factor analysis of the scale Confidence in the Skills of Educators and Encouragement of Self-Regulation (CSEES)

Factors were rotated by Promaks rotation, and the structure of factors is shown in Table 2. The first factor brought together items whose content indicates the belief of educators that he/she can support the development of self-regulation in children, but also the belief that self-regulation is important and therefore the factor is called Importance and Support for Self-Regulation (ISS). The second factor brought together items related to educators' belief that they can adequately lead a group and correct children's behavior and was called the Group Leadership Awareness (GLA). The reliability of the scales measured by the Cronbach's alpha was $\alpha = 0.85$ for the first factor and $\alpha = 0.80$ for the second factor, indicating excellent scale reliability.

Table 2
ISS scale assembly matrix

Item	Factor 1 (ISS)	Factor 2 (GLA)
In ordinary activities, I am certain that I can challenge and improve children's self-regulated learning capacities.	0.85	
I am convinced that through children's play, I can support the development of children's self-regulated learning.	0.76	
I am convinced that I can do practices that have a positive impact on children's self-regulated learning.	0.75	
I am confident that I can collaborate with colleagues to help youngsters develop self-control in their learning.	0.70	
I think educators have an important role to play in promoting children's self-regulated learning.	0.69	
I think it is important for the future lives of children how they master self-regulated learning in kindergarten (before school).	0.49	
I think assessing children's self-regulated learning is important.	0.47	
I am confident that I can provide parents with important knowledge on how to help their children develop self-control and self-regulated learning at home.	0.37	
I think self-regulated learning skills change when children grow up.	0.31	
I am convinced that I can effectively resolve children's conflicts.		0.84
I am convinced that I can consistently meet expectations in all environments.		0.70
I am convinced that I can effectively manage my child's inappropriate behavior.		0.69
I am convinced that I can teach youngsters self-direction, i.e., the ability to self-regulate, not be regulated by others, be independent and not rely on others.		0.56
I am convinced that I can involve children in a structured problem-solving process.		0.49
I am confident that I can work effectively with parents to ensure that kindergarten and home are consistent.		0.36

Factor analysis of the Attitudes toward Children's Independence Scale

In the case of the ACI scale, three items ("I encourage children to complete tasks on their own.", "I think most children in my group can be motivated even without my guidance.", and "Several children in the group find it difficult to calm down after anxiety.") had extremely low utilities of 0.13 and below, and they were excluded from the analysis. The structure of the factors is shown in Table 3 and indicates that this factor is related to the attitude that children need guidance and help from educators. The reliability of the scale measured by Cronbach's alpha was acceptable ($\alpha = 0.65$).

Table 3

ACI scale structure matrix (Attitudes towards Children's Independence)

Item	Factor
I spend much of my time in the playroom, where I teach and model proper behavior for youngsters.	0.87
I think children in the playroom should be supervised by an adult.	0.52
I often notice that some children have difficulty completing tasks on their own and need my guidance.	0.50

Descriptive statistics scale

Table 4 shows the basic descriptive indicators for the KSSL, ISS, and ACI scales. All variables had skewness and kurtosis values in the recommended range of ± 2 (George and Mallery, 2010), indicating that the variables did not deviate significantly from the univariate nominal distribution.

Table 4.

Descriptive scale indicators

	minimum	maximum	AS	SD	skewness	kurtosis
KSSL	1.60	4.60	3.45	0.56	-0.64	0.61
ISS	2.67	4.89	3.90	0.46	-0.30	0.17
GLA	2.33	4.84	3.64	0.47	-0.16	0.12
ACI	1.33	5	3.56	0.70	-0.10	-0.18

Differences on the KSSL scale in relation to the level of education, length of service, and position

One-way analysis of variance indicates that there are no significant differences on the KSSL scale in relation to the level of education, $F(4, 494) = 0.96$, $p > 0.05$. One-way analysis of variance indicates that there are statistically significant differences on the KSSL scale in relation to length of service, $F(3, 495) = 3.20$, $p = 0.023$. LSD post hoc test was applied to examine the differences between individual groups. Significantly more scores on the KSSL scale were obtained by educators and their assistants with more than 31 years of service ($AS = 3.62$) compared to those with up to 10 years of service ($AS = 3.40$) and in relation to those with work experience of 11 to 20 years ($AS = 3.39$). The T-test for independent samples indicates that there are no statistically significant differences between the educator and the assistant educator in relation to the KSSL scale, $t(497) = -0.47$, $p > 0.05$.

Differences on the ISS scale in relation to the level of education, length of service, and job

One-way analysis of variance indicates that there are no significant differences on the ISS scale in relation to the level of education, $F(4, 494) = 0.26$, $p > 0.05$, as well as in relation to the length of service, $F(3, 495) = 2.04$, $p > 0.05$. The T-test for independent samples indicates that there are no statistically significant differences between educators and assistant educators in relation to the ISS scale, $t(497) = 0.67$, $p > 0.05$.

Differences on the GLA scale (in relation to the level of education, length of service and position)

One-way analysis of variance indicates that there are no significant differences on the GLA scale in relation to the level of education, $F(4, 494) = 0.72$, $p > 0.05$. One-way analysis of variance indicates that there are statistically significant differences on the GLA scale in relation to length of service, $F(3, 495) = 4.42$, $p = 0.04$. LSD post hoc test indicates that educators and assistants who belong to the group of those with the longest work experience, more than 31 years ($AS = 3.84$, $SD = 0.43$), have significantly higher scores on this scale compared to other groups, up to 10 years of service ($AS = 3.62$, $SD = 0.47$), between

11 and 20 years of service (AS = 3.60, SD = 0.47) and between 21 and 30 years of service (AS = 3.56, SD = 0.49). There were no significant differences between those with shorter work experience. The T-test for independent samples indicates that there are no statistically significant differences between educators and assistant educators in relation to the GLA scale, $t(497) = 0.97$, $p > 0.05$.

Examining the relationship between the KSSL, ISS and ACI scales

Pearson's correlation coefficient examined the relationship between the KSSL, ISS, GLA, and ACI scales. Correlation coefficients are shown in Table 5. All correlations were positive and significant at the level of $p < 0.01$, and their intensity was interpreted in relation to the Cohen guidelines (Cohen, 1988). The connection between the KSSL and ISS scales was of strong intensity. The association of the GLA scale with the KSSL and ISS scales was of medium to high intensity, while the association of the ACI scale with other scales was of weak to moderate intensity.

Table 5
Correlations between scales in research

	KSSL	ISS	GLA	ACI
KSSL	1			
ISS	0.58	1		
GLA	0.37	0.47	1	
ACI	0.19	0.19	0.18	1

Conclusions

Considering that we have dealt with the topic of self-regulatory learning in kindergarten, which has never been researched in Slovenia (or neighboring countries), and that the role of educators and their impact on children's skills in implementing activities that promote self-regulation learning is great, we think they should offer more content to help them strengthen their role. All participants in the education of educators should regularly update the curriculum and syllabus in accordance with the needs of modern change, so that educators, in addition to formal education and professional practice in kindergartens, get the best opportunity for continuing education.

According to the obtained research data, a review of professional and scientific literature, and world-class research, we can conclude that self-regulatory learning in kindergarten is a topic that needs more attention and extra effort. We provide opportunities for additional professional development and educators' training, especially with examples from practice or programs and activities that directly affect the self-regulatory learning of children. Educators are already carrying out activities that affect children's self-regulation and consequent self-regulatory learning. To cite the most common examples, these are following group rules, waiting in line, and cooperating with peers, where children acquire self-regulation skills, albeit unknowingly and not intentionally. Self-regulatory learning should be promoted in early educator training, starting in high school, so that educators are aware of their role in supporting self-regulatory learning in kindergarten. If pupils and students of educational school and faculty have had self-regulatory learning experience, that experience will have a significant impact on the transfer of self-regulatory learning into practice and direct work in kindergarten.

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Conflict of interests

The authors declare no conflict of interest.

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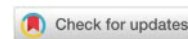
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Investigation of Prospective Teachers' Use of Mobile Technologies in Teaching Activities

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Abstract: The purpose of this research is to examine the pre-service teachers' use of mobile technologies in teaching activities. In this study, the survey method, one of the research methods, was used. The 199 prospective teachers studying at the Faculty of Education, a private university in Northern Cyprus, were included in the workgroup of the research. The 5-point Likert-type scales were used to measure the frequencies of using mobile technologies in instructional activities, motivation, and attitudes towards mobile technologies, competencies in mobile technology use, and its social effects. It was found that social factors had the lowest effect on the use of mobile technologies. Additionally, no gender-based difference was found in the mobile use frequency, motivation, attitude, competency, and social impact of prospective teachers. Moreover, the frequency, motivation, attitudes, competency, and social impact levels of students from the Department of Computer and Instructional Technologies are significantly higher than those departments from Guidance and Psychological Counselling, Special Education, Music Teaching, Elementary School Mathematics Teacher Education, Department of Pre-School Teaching, Classroom Teaching Department, Social Sciences Teacher Education, Turkish Language Teaching. It was concluded that having problems for mobile learning activities that can be used in the scope of mobile learning significantly influences the frequency of use, motivation, attitude, competency, and social impact of the students. Along with this, it was found that the following factors, given in order of importance, are influential on the frequency of the use of mobile technologies by prospective teachers in instructional activities: motivation, attitude, competency, and social impact.

Keywords: prospective teachers, mobile technologies, learning activities, pre-services teachers.

Introduction

Technology, in today's world, continues to develop rapidly become an indispensable aspect for people, and gained an important place in people's lives (Geng, Tan and Yang, 2021). Today, one of the important factors in the widespread use of portable and wireless smartphones and tablet PCs (Sung, Chang and Liu, 2016) is that they are everywhere with people (Georgiev, Georgieva and Smrikarov, 2004). In parallel to this increase, there is also a raise in the context of educational settings. That is why; technology has earned its place in education. Government-funded projects supporting technological content have been realized and schools started to have technological infrastructures. Thanks to mobile devices, students can have access to information at any given place, time (Goundar 2011) and this helps them to develop problem-solving skills and increase learner autonomy (Hakim, Asikin and Nurcahyono, 2021; Cavuş and Uzunboylu, 2009).

When the definitions suggested in the literature for mobile learning are reviewed, Stone (2004) defined the term as e-learning taking place through devices that have Internet connection features. According to the definition suggested by Georgieva, Smrikarov, and Georgiev (2004), it is the use of devices, which can enable interaction without time and space limitations between the instructor and the students, for educational purposes. In addition, Georgiev et al. (2004) put forward that mobile learning is not a new concept and that it is a relatively new concept for e-learning and distance education. It was stated that mobile learning devices have a positive influence on both in-class and outside-the-classroom

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learning activities ([Çelik, 2013](#)). The case of using mobile technologies as an effective learning tool is obvious. However, there are certain negative sides as well. According to [Ober and Daniels \(2013\)](#), mobile devices having a smaller screen compared to other technological devices, extra costs such as Internet connection, and difficulty in writing texts are major challenges we are facing.

Looking at the literature, it has been seen that there are studies ([Sirakaya, 2019](#); [Şahin, 2019](#)) aiming to reveal the situation of prospective teachers and teachers regarding the use of technology in education. [Şahin \(2019\)](#) conducted a metaphor study to determine the views of teachers on the use of information technology in education. The metaphors that teachers made about technology use were grouped under the themes of "useful tool", "depth, development and change" and "double effect". In the study, it was stated that teachers think that using information technologies in education is most beneficial, but they also point out that it can have devastating effects.

The declaration of a global epidemic by the World Health Organization at the beginning of 2020 and the fact that COVID-19 is a contagious and spreading virus caused many things to change in our lives. It has made technology more involved in our lives. Meetings began to take place via remote connection, and even education and training had their share of it. While non-contact technologies have started to take a full place in our lives, distance education and teaching have started to be implemented especially in schools of many countries. Individuals had to continue their lives away from contact. Therefore, mobile technologies have played an important role in education ([Akhigbe, Ogbonnaya and Owolabi, 2021](#)).

In another study, it is understood that pre-service mathematics teachers have positive thoughts about the learning environment supported by mobile learning. Particularly, a significant part of pre-service teachers thinks that m-Learning in university courses will be more beneficial when combined with face-to-face learning. Pre-service teachers found mobile learning necessary and useful; however, it is understood that they think that it is costly because it requires an internet connection and charging facilities. In addition, some prospective teachers state that mobile learning is very economical and cheaper than school ([Koparan and Yilmaz, 2020](#)). [Gökbulut \(2021\)](#) found that the perception level of university students towards distance education is moderate. In addition, university students' readiness levels for mobile learning were found to be high. It is among the findings of this research that there is no significant difference between readiness for mobile learning according to gender, age, and education ([Gökbulut, 2021](#)).

Based on the assumption that mobile devices will be used more widely in the coming years, it can be said that mobile learning will become much more common. However, in today's conditions, a higher education level is more suitable for mobile learning ([Sabah, 2016](#)). University-level students' widespread use of mobile devices and the provision of wireless internet to students in campus environments make higher education advantageous in terms of mobile learning ([Cheon et al., 2012](#)). [Christensen and Knezek \(2017\)](#) and [Christensen and Knezek \(2018\)](#) stated that mobile learning readiness should be determined before starting mobile learning. Thus, it is thought that students will be ready for mobile learning. Mobile learning readiness can be expressed as students' readiness and preference to use mobile devices as part of the learning process ([Mahat, Ayup and Luan, 2012](#)). Determining students' mobile learning readiness can provide guiding information in terms of the design, development, and implementation of mobile learning ([Sirakaya and Sirakaya, 2021](#)).

Attitude is the tendency of an individual to show positive or negative behavior towards a situation or event, and the attitude of individuals towards this innovation is a determining factor in the adoption of an innovation by individuals ([Davis, 1989](#)). In other words, students' attitudes towards new technology will positively or negatively affect the effective and efficient use of that technology in the classroom. This situation can be interpreted as the students' attitudes towards mobile learning will be effective in the successful use of mobile learning in education. In the study conducted by [Martin and Ertzberger \(2013\)](#), it was determined that students' attitudes towards mobile learning positively affect their attitudes towards lessons. Similarly, in the experimental research conducted by [Hwang and Chang \(2011\)](#) it was determined that the education performed on mobile learning increased the attitude towards learning.

The situation of teachers or students being able to use mobile technologies can sometimes be due to their not knowing how to use it, and sometimes because they do not have enough economic power to buy efficient mobile technologies. This increases the gap between countries that have these opportunities and those that do not ([Korucu et al., 2016](#)). Thus, due to the problems in mobile technologies and internet infrastructure, it affects learning in education, causing a lack of motivation in students and learning attitudes are negatively affected. They will also have limited access to learning materials. Therefore, teachers avoid giving their students assignments that require mobile technologies or learning technologies ([Ribble, Bailey and Ross, 2004](#)). Slow internet connection and infrastructure problems prevent students from using mobile technologies frequently. In addition, it has been observed that students use mobile technologies less frequently in learning activities due to misuse or inability to use mobile devices properly.

In some countries, so that students' learning is not affected, guidance counselors have suggested that students who do not have mobile technologies can be loaned tablets, phones or laptops. They also emphasized that online lessons are a necessity for teachers to overcome problems in online learning and increase students' interaction in the lesson and reduce boredom (Lestari, Astuti and Bhakti, 2020). In the study conducted by Dinis da Costa and Araújo (2016) for the European region, they reported that if students access information on the Internet from home, they achieve better results in digital reading than in printed text.

Problem Statement

It is obvious that future teachers will make learning more permanent with the integration of mobile technologies in instructional activities to prepare the youth for the future. Not limiting the students' learning to the school environment and providing them with learning opportunities with out-of-the-school activities can only be realized through mobile learning. Thus, it is crucial to determine the factor influencing prospective teachers' use of mobile technologies in instructional activities to increase the quality of education. Taking this as the starting point, the following problem statement is the focal point of this study: "What is the influence of the frequency of prospective teachers' use of mobile technologies in instructional activities on learning?"

Research Questions

1) According to the gender, department, and having problems (having slow internet connection or infrastructure problems, misuse or inability to use mobile devices properly) for mobile learning activities that can be used in mobile learning, is there a significant difference in the prospective teachers':

- a) Frequency of using mobile technologies in learning activities;
- b) Motivation towards mobile learning;
- c) Attitude towards mobile learning;
- d) Competency in using mobile technology;
- e) Social impact

2) What are the major factors that influence the frequency of prospective teachers' use of mobile technologies in instructional activities? (Motivation, attitude, mobile technology use competency, social impact)

Aim of the Study

This research was aimed to examine whether there is a significant difference between mobile technology use frequency, attitude, and motivation towards using mobile technology and their competency according to gender, department, and having problems for mobile learning activities that can be used in mobile learning. It was also aimed to investigate the attitudes, motivation, competency, and social impact and its impact on the frequency of using mobile technologies in instructional activities.

Significance of the Study

Technology has a significant place in the developing world. In this regard, the impact of technology on learning is worthy of attention (Yilmaz, 2011). The constantly increasing number of mobile devices makes the role of mobile learning more important. As the future teachers are prospective teachers of today, the investigation of factors, influencing their mobile technology usage frequency is a significant issue.

Materials and Methods

Research Method

The methodology of the current study could be stated as a descriptive survey model. In survey studies, the opinions, abilities, interests, skills, and attitudes of a group of participants about a subject or event are determined. In addition, these studies are generally conducted on larger samples than other studies (Büyükoztürk et al., 2018).

Participants

The main aim of the research is to investigate the most critical factors, which are likely to influence the frequency of using mobile technology for learning activities of the 199 prospective teachers that are studying at the Faculty of Education in a private university during the 2020-2021 fall semester in Northern

Cyprus. The frequency of participants' socio-demographic variables could be indicated in Table 1.

Table 1

Demographic characteristics of the participants

Variables	Group	f	%
Gender	Male	100	50.3
	Female	99	49.7
	Total	199	100.0
Departments	Computer Education and Instructional Technology	16	8.0
	Guidance and Psychological Counselling	29	14.6
	Special Education	34	17.1
	Music Teaching	17	8.5
	Elementary School Mathematics Teacher Education	19	9.5
	Department of Pre-School Teaching	26	13.1
	Classroom Teaching Department	21	10.6
	Social Sciences Teacher Education	18	9.0
	Turkish Language Teaching	19	9.5
	Total	199	100.0
Having problems for Mobile Learning Activities	No	56	28.1
	Yes	143	71.9
	Total	199	100.0

It could be expressed that of those 199 respondents 50.3% were males while 49.7% were female. Moreover, it might be discussed that most of the respondents were studying at Guidance and Psychological Counselling and Pre-school Teaching departments. Furthermore, it could be argued that 31.2% of the respondents were at least 22 years old and 71.9% of the respondents indicated that they have no problems for mobile learning activities.

Data Collection Tool

It could be stressed that [Tonga's \(2015\)](#) Mobile Technologies in Learning Activities Scales were employed to collect data from the prospective teachers by appointing 5-point Likert-type scales. Furthermore, it might be mentioned that Cronbach's alpha test was also conducted to test the reliability of the scales. Findings regarding Cronbach's alpha test for each of the scales were indicated in Table 2.

Table 2

Findings of Cronbach's alpha reliability test

Name of scale	Cronbach's Alpha (α)
Frequency of Mobile Learning	.893
Motivation towards mobile learning	.870
Attitudes towards mobile learning	.883
Competence of using mobile technology	.872
Social Impact	.853

With the light of the Cronbach Alpha test, it could be concluded that the scales are highly reliable to collect data from the respondents.

Data Analysis

SPSS (Statistical Package for Social Sciences 24) software program would be used to analyze data. Moreover, descriptive statistics, independent samples t-test, one-way ANOVA, and lastly multiple regression analysis would be conducted to interpret findings.

Results

Descriptive findings regarding the scales were illustrated in Table 3. As seen in Table 3, in light of the mean scores, it could be argued that factors related to social impact were the least effective for the respondents to use mobile technologies in learning activities. As a result of Kolmogorov-Smirnov (K-S) tests performed on the general totals and sub-categories obtained from the scales, it was understood that all the data were normally distributed ($p > .05$).

Table 3
Descriptive findings regarding scales

Scale	N	\bar{X}	Sd	K-S (p)
Frequency of mobile learning	199	3.29	.590	.256
Motivation towards mobile learning	199	3.73	.622	.156
Attitudes towards mobile learning	199	3.52	.642	.175
Competence of using mobile technology	199	3.62	.783	.350
Social impact	199	3.29	.493	.225

Findings and Interpretations of Independent t-test and One-Way ANOVA Analysis

For the current study, prospective teachers had also examined to determine statistical differences in terms of attitudes towards mobile learning, motivation towards mobile learning competency of using mobile technology, and social impact in the context of some socio-demographic variables such as gender, department, having problems for mobile learning activities.

Table 4
Independent samples t-test findings according to gender

Scale	Gender	N	\bar{X}	Sd	Df	t	p
Frequency of Mobile Learning	Female	99	3.21	.530	197	-1.944	.053
	Male	100	3.37	.622			
Motivation towards mobile learning	Female	99	3.64	.629	197	-2.048	.420
	Male	100	3.82	.605			
Attitudes towards mobile learning	Female	99	3.55	.616	197	.820	.413
	Male	100	3.48	.667			
Competency of using mobile technology	Female	99	3.64	.769	197	.354	.723
	Male	100	3.60	.800			
Social Impact	Female	99	3.21	.789	197	-.698	.486
	Male	100	3.29	.852			

Table 4 exhibits the independent t-test according to gender findings for prospective teachers by considering five scales namely: Frequency of mobile learning, motivation towards mobile learning, attitudes towards mobile learning, competency of using mobile technology, and lastly social impact. It could be indicated that there was no statistical difference among gender and scales ($p > .05$).

Table 5
Findings of one-way ANOVA analysis according to departments

Scales	Source of Variation	Sum of Squares	Sd	Mean Squares	F	p
Frequency of Mobile Learning	Between Groups	8,769	8	1,096	3,458	,001
	Within Groups	60,237	190	,317		
	Total	69,006	198			
Motivation towards mobile learning	Between Groups	6.365	8	.796	2.150	.330
	Within Groups	70.304	190	.370		
	Total	76.669	198			
Attitudes towards mobile learning	Between Groups	12.563	8	1.570	4.319	.001
	Within Groups	69.085	190	.364		
	Total	81.647	198			
Competency of using mobile technology	Between Groups	24.655	8	3.082	6.042	.001
	Within Groups	96.905	190	.510		
	Total	121.559	198			
Social Impact	Between Groups	13.816	8	1.727	6.144	.001
	Within Groups	53.402	190	.281		
	Total	67.217	198			

Findings revealed that there were no statistical differences among prospective teachers' motivation levels towards mobile learning and their departments ($F(8,190)=2.150$ $p>.001$). However, "One-way ANOVA" results stressed that frequency of mobile learning use of prospective teachers' ($F(8,190)=3.458$ $p<.001$), attitudes of prospective teachers' towards mobile learning ($F(8,190)=4.319$ $p<.001$), prospective teachers' competency of using mobile technology ($F(8,190)=6.042$ $p<.001$), prospective teacher's social impact of using mobile technology ($F(8,190)=6.144$ $p<.001$), and departments were statistically significant (Table 5).

To advance understanding regarding the statistical differences, the Tukey post hoc test was conducted for the current study. Results indicated that there were significant differences between the frequency of mobile learning, attitudes towards mobile learning, competency of using mobile technology, and social impact of using mobile technology in learning activities and the departments of "Computer Education and Instructional Technology", "Classroom Teaching", "Turkish Language Teaching", "Guidance, and Psychological Counselling", and lastly "Pre-School Teaching". In other words, prospective teachers that are studying at Computer Education and Instructional department tend to use mobile technology more frequently, their attitudes towards mobile learning, competency of using mobile technology, social impact were better when compared with other mentioned departments.

The current study also attempted to investigate statistical differences of prospective teachers' in the context of having problems for mobile learning activities in terms of their frequency of mobile learning, motivation towards mobile learning, attitudes towards mobile learning, competency of using mobile technology, and lastly social impact. Findings of independent samples t-test were exhibited in Table 6.

Table 6

Independent samples t-test analysis on having adequate technology for mobile learning activities

Scales	Having problems for Mobile Learning Activities	N	\bar{X}	Sd	df	t	p
Frequency of Mobile Learning	No	56	3.03	.805	197	-2.393	.018
	Yes	143	3.34	.815			
Motivation towards mobile learning	No	56	3.46	.611	197	-3.984	.000
	Yes	143	3.84	.595			
Attitudes towards mobile learning	No	56	3.13	.529	197	-5.744	.000
	Yes	143	3.67	.619			
Competency of using mobile technology	No	56	3.15	.730	197	-5.680	.000
	Yes	143	3.80	.727			
Social Impact	No	56	3.04	.530	197	-3.890	.000
	Yes	143	3.39	.574			

($p < .001$)

Findings of independent samples t-test stressed that those prospective teachers having problems for mobile learning activities were more frequently using mobile technology in learning activities. They tend to have higher intentions (attitudes) and were more motivated towards mobile learning, had a more social impact on using mobile technology when compared with the prospective students those problems for mobile learning technology. Thus, it could be indicated that prospective teachers are significantly different in the context of having problems for mobile learning activities by relying on their frequency of using mobile technology in learning activities, attitudes towards mobile learning, motivation towards mobile learning competency of using mobile technology and lastly their social impact ($p < .05$).

Table 7

Multiple Regression Findings of Frequency of Using Mobile Learning Technology on Learning Activities

Variables	B	Standard Error	β	t	p	Zero-Order r	Partial r
Constant	.949	.278		3.417	.001		
Attitude	.341	.068	.355	5.035	.000	.469	.346
Motivation	.012	.067	.012	.176	.860	.279	.013
Competency	.157	.052	.203	3.033	.003	.387	.217
Social Impact	.265	.078	.213	3.377	.001	.326	.240

R=0.564 $R^2 = 0.318$

$F_{(4-186)} = 21.690$ $p = 0.000$

$p < .001$.

As previously mentioned, multiple regression analysis was employed to test how the frequency of using mobile technology in learning activities are linked with attitudes on mobile technology, motivation towards mobile learning, competency of using mobile technology, and social impact of mobile learning are related to each other. Findings of multiple regression analysis revealed there was a significant relationship ($R = 0.564$, $R^2 = 0.318$) among motivation towards mobile learning, attitudes toward mobile learning, competency in using mobile technology, and the social impact of using mobile technology. Moreover, it could be discussed that 31.8% of the variation in the frequency of using mobile technology in learning

activities is explained by four independent variables (Motivation towards mobile learning, attitudes towards mobile learning, competency of using mobile technology, the social impact of using mobile technology (Table 7).

In the light of the standardized regression coefficients (β) order of importance of predictor variables may be expressed as attitudes ($\beta=0.355$), social impact ($\beta=0.213$), competency ($\beta=0.203$), and motivation ($\beta=0.012$).

Moreover, when the significance tests of the regression coefficients are examined, it is concluded that the variables of attitude ($p < 0.001$), social impact ($p < 0.01$), and competency of using mobile technology ($p < 0.01$) are statistically significant predictors for frequency of using mobile technology in learning activities.

Aside from these, the current study also aimed to investigate the correlation among predictor variables and the frequency of using mobile technology. Correlation among attitude of using and frequency of using mobile technology on mobile learning could be expressed as ($R=0.469$) while correlation among social impact towards to use and frequency of using mobile technology in learning activities might be indicated as ($R=0.326$) whereas correlation among motivation towards to use and frequency of using mobile technology in learning activities could be stressed as ($R=0.279$). Multiple Regression Equation with regard to frequency of using mobile technology in learning technology could be stated as follows:

Frequency of using mobile learning technology on mobile learning activities= ($0.341 \times \text{Attitude}$) + ($0.012 \times \text{Motivation}$) + ($0.157 \times \text{Competency of using mobile technology}$) + ($0.265 \times \text{Social Impact}$) + (0.949)

In addition, it was concluded that the frequency of using mobile technology in learning activities of pre-service teachers was affected by their attitudes towards mobile technology use, social impact, their competence in using mobile technology and their motivation to use this technology.

Discussion

It can be said that there is no statistically significant difference between the scales of "Frequency of Mobile Learning", "Motivation towards mobile learning", "Attitudes towards mobile learning", "Competency of using mobile technology", "Social Impact" and gender. Results of independent samples t-test analysis were congruent with the findings of [Şad and Nalçacı \(2015\)](#), [Yavuz and Dönmez \(2014\)](#) whereas, independent samples t-test results of the study were not consistent with the findings of [Akgül, Küpeli and Kır \(2015\)](#), [Yılmaz \(2011\)](#) and [Menzi, Çalışkan and Çetin \(2012\)](#). When the studies on the difference between mobile learning and gender are examined, it is found that there is no significant difference between male and female university students in support of the research finding ([Elçiçek and Karal, 2019](#); [Korucu, Ertuğrul and Çoklar, 2019](#)). But in the past, there were also studies in which men's use of mobile technology was significantly better than women's ([Ozdamli, Soykan and Yildiz, 2013](#)).

Findings revealed that there were no statistical differences among prospective teachers' motivation levels toward mobile learning and their departments. Results indicated that there were significant differences between the frequency of mobile learning, attitudes towards mobile learning, competency of using mobile technology, and social impact of using mobile technology in learning activities and departments. In other words, prospective teachers that are studying in Computer Education and Instructional department tend to use mobile technology more frequently, their attitudes towards mobile learning, competency of using mobile technology, social impact were better when compared with other mentioned departments. Moreover, the findings of the current study which related to departments and competency of using mobile technology were not congruent with the findings of [Usta and Korkmaz \(2010\)](#).

It could be indicated that prospective teachers are significantly different in the context of having problems for mobile learning activities by relying on their frequency of using mobile technology in learning activities, attitudes towards mobile learning, motivation towards to mobile learning competency of using mobile technology and lastly their social impact. In the findings obtained as a result of another research, positive attitudes were stated in the academic success and mobile learning attitudes of the students ([Elçiçek and Bahçeci, 2017](#)).

Moreover, it could be discussed nearly thirty-two percent of the variation in the frequency of using mobile technology in learning activities is explained by four independent variables (Motivation towards mobile learning, attitudes toward mobile learning, competency of using mobile technology, and the social impact of using mobile technology). In addition, it was concluded that the frequency of using mobile technology in learning activities of pre-service teachers was affected by their attitudes towards mobile technology use, social impact, their competence in using mobile technology and their motivation to use this technology. In another study, it was found that the tendencies toward the use of technology in the course had a positive, moderately significant relationship on the independent variable attitude towards

mobile learning (Uyar and Karakuyu, 2019). It has been found that the structures that makeup students' attitudes towards mobile learning predict twenty-two percent of the variance in attitudes towards learning (Tuncer and Dikmen, 2020).

Theoretical and practical implications

Theoretical Implication

A theoretical meaning of this study is how effective the determined factors (Frequency of mobile learning, motivation towards mobile learning, attitudes towards mobile learning, competency of using mobile technology, and lastly social impact) are on pre-service teachers' use of mobile technologies during learning activities. With the use of mobile devices in learning activities by teachers, students' success in lessons will increase. By determining the frequency of use of mobile devices for learning activities by pre-service teachers, it was tested how the frequency of using mobile technology in learning activities is related to their attitude towards mobile technology, motivation towards mobile learning, competency in using mobile technology and the social impact of mobile learning. Thus, the gap in the literature was tried to be partially filled with this research.

Practical Implication

Considering that Mobile Learning activities will increase the interaction between teachers and students, with the rapid spread of mobile technologies in both classroom applications and distance learning environments, the research trend in mobile technologies and mobile learning has increased rapidly and attracted academic research in this field. In this study, the frequency of use of mobile learning teaching activities is suggested as an important variable. It was also emphasized in this research that the variables of attitude towards mobile technology, motivation towards mobile learning, competency in using mobile technology and social impact are important predictors for the frequency of use of mobile learning and teaching activities. For this reason, if pre-service teachers in education faculties are asked to use mobile technologies more in their teaching activities, then their attitudes, motivation, competencies and social impact perceptions (environment, image acquisition in the environment, peer influence) should be increased.

Limitations of the study

A limitation of this study is that while all teachers have mobile technologies, some teachers encountered problems when using these technologies in their learning activities (having slow internet connection or infrastructure problems, misuse or inability to use mobile devices properly). Therefore, considering the variables of the research, prospective teachers who never used mobile technologies in learning activities or did not have mobile technologies were not included in the study.

Conclusion and Recommendations

In this study, pre-service teachers' frequency of using mobile technology in learning activities, their attitudes towards mobile learning, their motivation for mobile learning, their ability to use mobile technology, and finally their social impact levels are similar according to gender. However, it can be said that computer-related departments are better than other departments or those who have no problems for mobile learning are better in these variables. Furthermore, this study revealed that prospective teachers' motivation and attitudes towards using mobile technology for learning activities, their competency, and social impact on mobile learning are critical factors that are shaping their frequency of using mobile technology for mobile learning activities. Besides these results, it is also argued that prospective teachers are statistically different in the context of have no problems for mobile learning activities in terms of their frequency of using mobile technology in learning activities, attitudes towards mobile learning, motivation towards mobile learning, social effect, and lastly their competency in using mobile technology. To be more accurate, findings concluded that prospective teachers having no problems for mobile learning activities are more frequently using mobile technology in learning activities, tend to have higher intentions (attitudes) and more motivated towards mobile learning and are more talented in using mobile technology when compared with the prospective students that have problems for mobile learning technology. Thus in the light of these findings, it is suggested that the necessary incentives should be provided by the governing bodies or on the basis of the state to equip classrooms with adequate technology to accelerate mobile learning activities for boundless education. Needless to state, education via mobile learning technologies

would become more popular in the coming years. Thus, academicians and teachers are recommended to disseminate interactive course contents, which will be more compatible with mobile learning. Lastly, for the further related studies, it is advised to the researchers to conduct their studies with experimental and control groups and employ case studies to create deep perspectives on the effectiveness of using mobile learning technologies for learning activities.

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Conflict of interests

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Original scientific paper

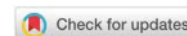
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Comprehensive Analysis of The Activities of Russian Federal Universities

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Abstract: This article aims to fully investigate the activities of the Federal Universities of Russia in the context of various aspects of development and to find appropriate comprehensive assessment methods that can be applied to modern universities that meet the best global standards. The main methods of research are comparative analysis and the formation of qualimetric models based on synthetically selected evaluation criteria. Structural changes in the activities of Russian federal universities have been analyzed. Authors analyze scientific, educational and social activities and other parameters. Particular attention is paid to the development of the ecosystem of innovations in Russian federal universities, its constituent elements and the peculiarities of their functioning. The study provides an opportunity to combine various aspects in the model of university activities. The article presents a comparative analysis of the development of federal universities and their ranking by integrated assessment. The development of communication channels between the academic community and mass audiences was analyzed, also the publication activity of federal universities was evaluated. The authors propose the main methods and sources of collection, processing and verification of disparate information on the state of innovation ecosystems in Russian federal universities. The proposed methodology, unlike existing approaches, allows a comprehensive assessment of the successful and underdeveloped activities of modern universities in both statistics and dynamics. The conclusion of the work is the need for a comprehensive analysis of federal universities by building a qualification parametric model on a regular basis.

Keywords: university ranking, higher school, education, expert assessments, scientometrics, institutional environment.

Introduction

The concept of high-profile universities in Russia emerged in 2006, when the legal framework was established and the first two federal universities (FU) – the Northern Federal University (NFU) and the Southern Federal University (SFU) – were created. Thirteen years have passed since then, and the ideas about the system under development and the related tasks have changed. Various ways and mechanisms of cooperation between the federal universities and outside world have been entering into force at different times, with special importance attributed to federal districts, where the universities function as development drivers and flagships in all senses and areas, including social, economic, political, scientific, explorative, cultural and educational aspects (Ivanov and Sokol-Nomokonov, 2018). Scattered talent pools located throughout the country and the ambition to create educational centers for new regional and federal elite resulted in the network of federal universities established in the Russian Federation. At the moment, there are ten national universities of this kind (one in each federal district, with three more universities in the Far Eastern Federal District, Southern Federal District and Northwestern

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Federal District; in the Central Federal District there is no federal university due to high number of top-quality higher educational institutions in Moscow).

Federal universities were mainly created in Russian regions through the merger of several universities into a single academic organization. The original purpose was to establish a leading university in each region. D. Salmi, a specialist in education policy, points out that "creation of leading universities exclusively by means of merger, especially in case of poor-quality educational institutions, is the most expensive, the slowest and highly risky way to achieve academic excellence" (Salmi, 2009).

It is important to make it clear what the "leading regional university" is understood to be. One more question is whether federal universities succeed in obtaining the status of leading educational institutions in their regions. First of all, they are not only educational, but also powerful scientific and research entities on a local level. Secondly, the background for their increasing prominence with regard to innovative processes in regions was predetermined historically. In more recent times, due to reorganization of higher education system carried out in the Russian Federation in the 21st century, these universities have taken part in transformation programs, obtained the status of federal scientific research entities, joined 5-100 competitiveness improvement program (five out of ten federal universities, namely Immanuel Kant Baltic Federal University, Far East Federal University, Ural Federal University, Kazan Federal University, Siberian Federal University), innovative universities contest, Digital University 2019 Competition (Ural Federal University) etc. Thirdly, these universities have already entered the regional innovative technological chain, established scientific and production ties with research centers and manufacturing enterprises, and, above all things, facilitated promotion and mass production of innovative products at these enterprises.

Summing up what has been said, Russian federal universities now face a wide array of tasks, which are aimed at the development of human potential and innovative ecosystems in local economies (Salmi and Frumin, 2013).

Literature review

Russian scientific literature review

Various problems related to the development of high-profile federal universities have been continuously discussed in Russian scientific discourse since 2006, when this concept first emerged (Altbach, 2018; Arzhanova and Knyazev, 2013; Verkhovets, Kirko and Keush, 2010).

E. Smolnikova from Kazan Federal University highlights the importance of cooperation between federal universities and the respective regions. She points to the growing collaboration of the aforementioned university with real economy and business sector. The accumulated experience shows that the synthesis of science and production is mutually beneficial for both parties, because the university in this case has financial sources for the development and introduction of new technologies, which is supported by the legislative package of Russian Government (Smolnikova, 2014).

Both Russian and foreign scientists put emphasis on scientific efficiency issues through the analysis of scientometric indicators of Russian universities (Balatsky and Ekimova, 2020; Petrosyants et al., 2020).

Quite a lot of articles focus on overall development problems experienced by the leading high-profile universities in Russia, with special attention paid to harmonious innovation eco-systems in the regions (Slobodchikova, Bojaeva and Goldenova, 2014).

Analysis of foreign researches

International scientific discourse analyzes the development of national high-profile universities from the point of view of their competitiveness improvement in the uncertain economic environment and today's circumstances that create new challenges for the academic community (digitalization, massive open online course development, disalignment with labor market etc.). In this regard, the analysis of higher education system reforms in Russia and foreign countries in Europe, Asia and America is of great interest (Guironnet and Peypoch, 2018).

After the Bologna Declaration and Lisbon Program were signed, reformation of European university systems has been dominating the global agenda, because regulations applied to European universities have created serious obstacles for their development in comparison with American peers. Moreover, the booming economies of China and India promote the creation of excellent universities in their countries. Europeans now face the challenge of using universities as drivers for cooperation between authorities, business and societies in order to make European economy more innovative and competitive (van der Ploeg and Veugelers, 2008).

During the last thirty years both Spain and Russia have been experiencing social and economic difficulties inherent to the transition period, with massive impact produced upon the financing, management

and quality of education. The year of 2007 marked the beginning of higher education system reforms in Spain, which gave the highest priority to research activities and knowledge transfer mechanisms used by universities. It is interesting to note that neither the availability and development of special infrastructure aimed at higher knowledge transfer rate (business incubators), nor the region's good financial standing affect the efficiency of research and studies carried out by universities, and the historically formed scholarly traditions are more important in this sense (Beregal-Mirabent, 2018). Similar problems in Italian higher education system were illustrated through an example of national universities in the period from 2000 to 2010 (Guccio, Martorana, and Mazza, 2016).

In evaluating the consequences and effects of the recent global economic crisis upon cuts in public higher education expenditures in European countries, some analysts came to conclusion that higher education system was to a smaller extent subject to harsh austerity measures as compared with education sector in general. These findings are valuable for understanding how national governments control public financing of higher education amid economic crisis (Skrbinjek, Sanlesjak and Sušteršič, 2018).

Some researchers pay attention to labor productivity in European universities. The general analysis shows great difference in production volume per researcher in various countries, diverse efficiency figures within each branch of knowledge and unequal distribution of resources per researcher. It is interesting to mention that all EU countries have significant capacities enabling them to increase the research volume without the need to spend more resources (Pastor and Serrano, 2016).

Materials and Methods

1. Primary information sources for this study comprise publicly available data from the official websites of Russian universities, websites of Russian state authorities, magazine articles (including those indexed in WoS and Scopus), and Russian scientific e-library used in accordance with Open Science paradigm.

2. The authors of the present article used information from the following websites:

- information analysis findings based on efficiency monitoring of higher education institutions / official website of the Ministry of Science and Higher Education of the Russian Federation. Main information computer center (<http://indicators.miccedu.ru/monitoring/?m=vpo>);

- official website of the Ministry of Science and Higher Education of the Russian Federation. National Education Project (<https://edu.gov.ru/national-project>);

- official website of the Russian Academic Excellence Project (<https://5top100.ru/en>);

- official website of the State Statistics Committee of the Russian Federation (<http://www.gks.ru>);

- abstract database of scientific publications Scopus (<http://www.scopus.com>);

- official website of Alexa Internet, Inc. (<https://www.alexa.com/login>);

- Russian science citation index (<http://www.elibrary.ru>);

- SCAN-Interfax. Russian mass media monitoring and social media analysis (<http://scan-interfax.ru>);

- official website of the Academy Interfax Project / National universities ranking (NUR-Interfax) (<http://academia.interfax.ru>). Abbreviated names of Russian universities used herein are available on this website.

3. The present study uses traditional investigation methods, including classification, comparative analysis, generalization, comparison and forecasting.

4. Study validity is ensured by the comparison of data coming from different sources together with various data validation methods, such as variability index, mean absolute deviation, variability range, skewness and kurtosis.

The procedure for collecting and processing identical and comparable data for synthetic qualimetric studies is a complex task in itself. The linear ranking technique consists of four stages: selection of calculated (initial) data, transition to dimensionless values, construction of the resulting indicator, ordering of the examined objects into a linear list. The difficulty of selecting indicators is that it is necessary not only to focus on the defining meaning and autocorrelation criteria, but also on their reliability and the possibility of verification.

$$R_i = \sum_j^n M \times r_{ij}, \quad (1)$$

Where: M - multipliers of individual indicators of the rating model, - a two-dimensional matrix of calculated indicators of the model, n - the number of rated objects. The value of private indicators is normalized to 100 points:

$$r_{ij} = r_{ij} / \max_i \{r_{ij}\} \times 1000 \quad (2)$$

The final value of the rating R is obtained by normalizing to 1000 points the synthetic result values of the model indicators:

$$R_i = R_i / \max_i \{R_i\} \times 1000 \quad (3)$$

The multifactorial model of the consolidated analysis of university activities implemented in our study consists of six research blocks (units) and is calculated using the formula:

$$SR = 0,2 \times BE + 0,2 \times BR + 0,15 \times BS + 0,15 \times BC + 0,15 \times BIE + 0,15 \times BB \quad (4)$$

Where SR – Summary Ranked list of universities, BE – Block of Education, BR – Block of Research, BS – Block of Socialization, BC – Block of Communications development, BIE – Block of Innovation and Entrepreneurship, BB – Block of university Brand development.

A total of 36 indicators of federal universities were used in six research blocks.

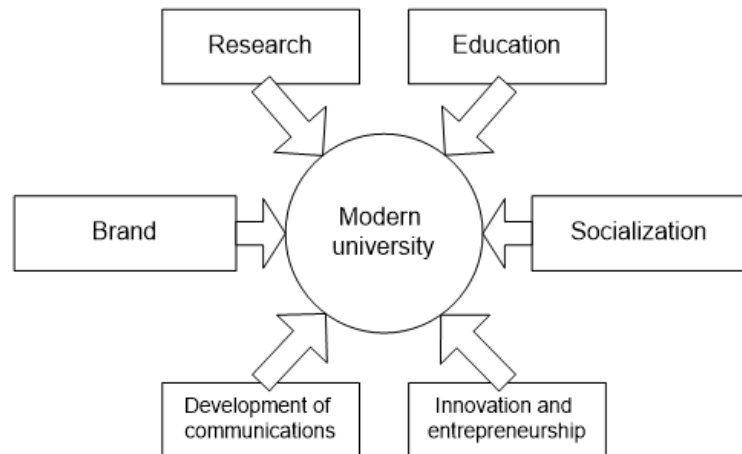


Figure 1. Model Research Blocks.

Results

Initially, we select the most relevant research criteria for the activities of universities and calculate correlation matrices, which gives information about the possible dependence of series, while assuming that in a number of criteria we consider them acceptable and level them with multipliers introduced into the task to each calculated criterion.

In addition, we calculate the model for a larger research sample than only federal universities (10), taking 317 Russian universities selected for the basic model. In this regard, the result obtained for the most successful federal university in block intermediate results will not be equal to 1000 points. To 1000 points, we will give only the final calculation for federal universities.

The first research block, - education (E), is calculated according to 6 criteria.

E1. The range of implemented educational programs of the first level of mass training of highly qualified personnel (bachelors and specialists) in 2020.

E2. Quality of applicants (input average examination score).

E3. Academic staff with degrees (number).

E4. Cost of educational services of the university in 2020.

E5. Organization of student practice. Composite assessment based on: the number of enterprises and organizations with which agreements on targeted training and organization of practice were concluded and operated in 2020, external participants ("practitioners") in the teaching staff of the university.

E6. Work with schools and schoolchildren. Composite assessment based on work with schoolchildren and schools.

Table 1

Correlation matrix for the Block of Education

	E1	E2	E3	E4	E5	E6
E1	1,000					
E2	0,364	1,000				
E3	0,048	0,186	1,000			
E4	-0,123	-0,042	0,370	1,000		
E5	0,309	0,145	0,052	-0,037	1,000	
E6	0,407	0,133	-0,001	-0,144	0,179	1,000

The second research block, - studies (R), is calculated according to 8 criteria.

R1. The range of educational programs (EP) implemented by the university on the second and third levels of training of research personnel of higher qualifications (masters, graduate students, doctoral students).

R2. The contribution of the university to the formation of the scientific and educational elite of the country. Regular measurements made by our research group are based on independent methodology. Graduates of universities who have become world-class scientists, have become members of national and foreign academies of sciences, rectors of universities, etc. are taken into account.

R3. Supercomputers. Performance of computing systems and the level of development of mathematical modeling. Evaluation of distributed computer networks of the university and efficient use of the resource.

R4. Scientific productivity of the authors of the University according to Scopus at the end of 2020. The number of articles published in the five-year period 2016-2020, normalized by the average number of academic staff over 5 years.

R5. Citation of University authors' articles according to Scopus at the end of 2020.

R6. Scientific productivity of University authors according to RSCI (Russian Science Citation Index) at the end of 2020.

R7. Citation of University authors' articles according to RSCI at the end of 2020.

R8. R&D funding at the University in 2020.

Table 2

Correlation matrix for the Block of Research

	R1	R2	R3	R4	R5	R6	R7	R8
R1	1,000							
R2	0,291	1,000						
R3	0,286	0,335	1,000					
R4	0,440	0,447	0,457	1,000				
R5	0,396	0,490	0,341	0,831	1,000			
R6	-0,046	-0,029	-0,090	0,104	0,031	1,000		
R7	0,032	0,071	-0,033	0,184	0,236	0,491	1,000	
R8	0,370	0,294	0,344	0,640	0,536	0,010	0,098	1,000

The third research block, - socialization (S), is calculated according to 5 criteria

S1. Average salary of academic staff of the University in 2020.

S2. Continuing education. Composite assessment, which includes: income from additional education services in the general budget of the university in 2020, Supplementary Vocational Education (SVE) programs implemented by the university, customers of the SVE EP, the number of students who received additional education in 2020.

S3. Campus quality and convenience. Evaluation by experts.

S4. Participation of the University in the development and implementation of programs of socio-economic development of the country, region, city. Evaluation by experts.

S5. Development of the social sphere of the University (social programs). Qualitative parameter:

participation of university representatives in the development of programs; joining expert councils and public councils of government bodies (federal, regional, city) (for the period 2016-2020).

Table 3
Correlation matrix for the Block of Socialization

	S1	S2	S3	S4	S5
S1	1,000				
S2	0,135	1,000			
S3	0,134	0,373	1,000		
S4	0,134	0,341	0,458	1,000	
S5	-0,030	-0,074	0,011	0,020	1,000

The fourth research block, - Block of Communications development (BC) -, is calculated according to 6 criteria.

D1. Foreign citizens in the contingent of students at the university (2020/21 academic year).

D2. International cooperation of the University in 2020 (joint publications).

D3. Global Communications of the University. The Alexa Sites Linking In indicator of the university's website at the end of 2020.

D4. University's research cooperation with foreign universities and research organizations.

D5. Educational programs (courses) of double diplomas.

D6. International Academic staff (academic mobility).

Table 4
Correlation matrix for the Block of Communications development

	D1	D2	D3	D4	D5	D6
D1	1,000					
D2	0,154	1,000				
D3	0,123	0,371	1,000			
D4	0,168	0,513	0,422	1,000		
D5	0,164	0,332	0,515	0,353	1,000	
D6	0,231	0,491	0,384	0,465	0,384	1,000

The fifth research block, the Block of university Brand development (BB), is calculated according to 5 criteria.

B1. "Selection of elites" - graduates of the university, who have become prominent state, political, business figures and other citizens, meritocratically considered to be among the elites of society.

B2. University communications with target audiences. Linear combination: the ranking of the university site Alexa Glob Rank, the ranking of the university site in the global section Science & Education Similar Web.

B3. Media activity of the University in 2020. Using the SCAN-Interfax database.

B4. The perception of the University's research by the international academic community. Hirsch index of the university in foreign scientometrical bases.

B5. The perception of the University's research by the Russian-speaking academic community. Hirsch index of the university in Russian scientometrical bases.

Table 5
Correlation matrix for the Block of university Brand development

	B1	B2	B3	B4	B5
B1	1,000				
B2	0,587	1,000			
B3	0,484	0,623	1,000		
B4	0,468	0,427	0,596	1,000	
B5	0,395	0,320	0,584	0,564	1,000

The sixth research block, Block of Innovation and Entrepreneurship (BIE), is calculated according to 7 criteria.

- IE1. Technological (innovative) entrepreneurship at the University.
- IE2. University Patent Portfolio.
- IE3. Cooperation of the University with high-tech companies.
- IE4. Academic spin-off companies of the University (Small Innovative Enterprises), University's Innovation Infrastructure
- IE5. University R&D
- IE6. Basic departments of the university. The share of R&D financing without attracting budget funds in the total budget of the university in 2020, normalized by the number of academic staff.

Table 6

Correlation matrix for the Block of Innovation and Entrepreneurship

	IE1	IE2	IE3	IE4	IE5	IE6
IE1	1,000					
IE2	0,514	1,000				
IE3	0,599	0,468	1,000			
IE4	0,295	0,424	0,319	1,000		
IE5	0,400	0,366	0,492	0,248	1,000	
IE6	0,189	0,287	0,234	0,319	0,274	1,000

Table 7 presents the data for calculating the qualimetric model according to the criteria selected for calculating the activities of Russian federal universities.

Table 7

Ranking of federal universities of Russia according to the results of calculating the research model

Rank	University	Research	Socialization	Development of communications	Brand	Innovation and entrepreneurship	Education	Total - without recalculation to 1000 points to the entire sample	Final total of 1000 points
1	KFU ¹	359	1000	437	320	612	899	607	1000
2	UrFU ²	421	753	384	314	535	835	549	904
3	SouthFU ³	467	725	226	192	430	979	525	865
4	SibFU ⁴	325	809	194	229	518	786	485	798
5-6	FEFU ⁵	289	688	195	160	513	719	435	717
5-6	NCFU ⁶	329	772	166	80	385	794	435	717
7	NEFUAmosov ⁷	306	617	127	100	499	810	425	699
8	BFUImmanuelKant ⁸	343	644	227	104	358	759	420	693
9	NArFU ⁹	277	289	187	83	367	878	370	609
10	CrimeanFUVernadsky ¹⁰	264	514	128	88	337	689	351	578

Source: compiled by the authors.

¹Kazan (Volga region) Federal University, ²The Ural Federal University named after the first President of Russia B. N. Yeltsin, ³Southern Federal University, ⁴Siberian Federal University, ⁵Far Eastern Federal University, ⁶North-Caucasus Federal University, ⁷The Ammosov North-Eastern Federal University (NEFU), ⁸Immanuel Kant Baltic Federal University, ⁹Northern (Arctic) Federal University named after M. V. Lomonosov, ¹⁰ V. I. Vernadsky Crimean Federal University.

Discussion

Federal Universities: Participation in «Priority-2030»

University activity research implies investigation and model analysis of complicated system development. Comprehensive assessment of university activity is provided by various rating systems, which are not always universally approved, but represent a useful tool that has become quite popular and informative in the last fifteen years (Balatsky and Ekimova, 2019). Information base comprising a whole range of performance indicators of Russian universities (including federal universities) was accumulated within the scope of research carried out by the task force known as National University Ranking Interfax (NUR-Interfax). One of co-authors of the present article (Petrostyants) acts as its expert member. Some of the findings of the aforementioned research are presented herein.

The diagram in Figure 2 shows the volume and sources of federal universities budgets.

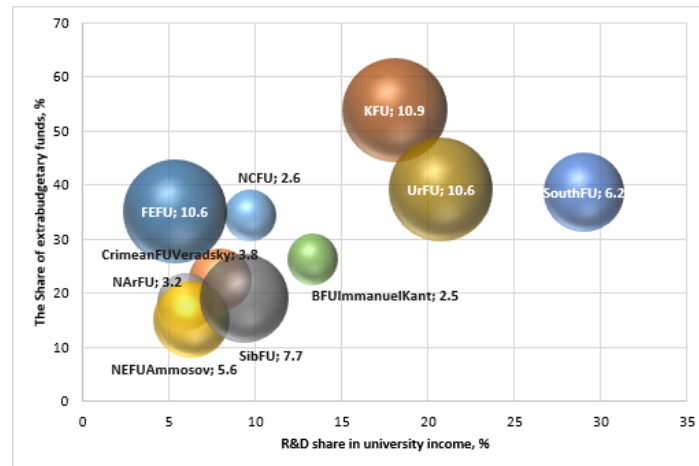


Figure 2. Budgets of federal universities (RUR bln) with the percentage share (%) of extrabudgetary funds and R&D in 2020.

Source: compiled by the authors according to the Ministry of Science and Higher Education of the Russian Federation

Figure 3 shows the overall R&D volume and its share per each member of academic, research and teaching staff in federal universities. The figures for ten federal universities are significantly different. For instance, in SouthFU and UrFU the amount of research and development revenues per person accounts for more than 400 kRUB, while in FeFU (129 kRUB), NeFUAmmosov (130 kRUB) и CrimeanFUVernadsky (14 kRUB) this figure is low.

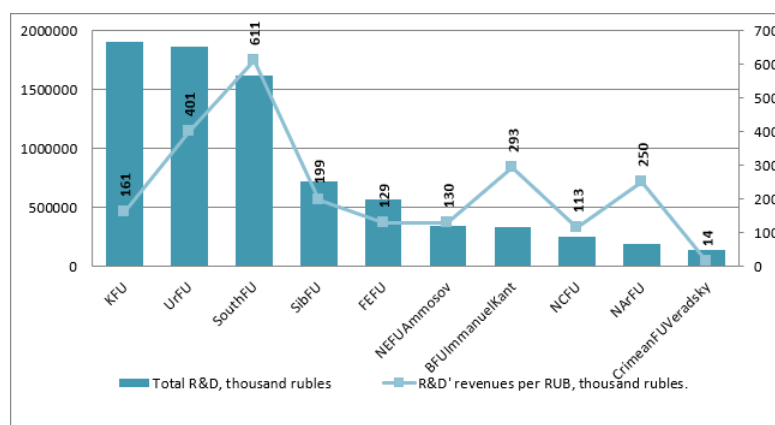


Figure 3. R&D revenues in the structure of federal universities' budgets in 2020.

Source: Ministry of Science and Higher Education of the Russian Federation

The dynamics of publications in mass media helps to keep track of university prominence in information and communication environment, while the index of prominence (earlier known as SPI) follows the quality of publications. Apart from the number of references, it takes notice of the source (publication in a leading newspaper is obviously more prominent than in regional mass media), object's

role in publication, its key note and many other linguistic and semantic parameters. Figure 4 shows the number of publications in mass media mentioning federal universities and the aggregate value of prominence index in 2020 (Brodovskaya et al., 2020).

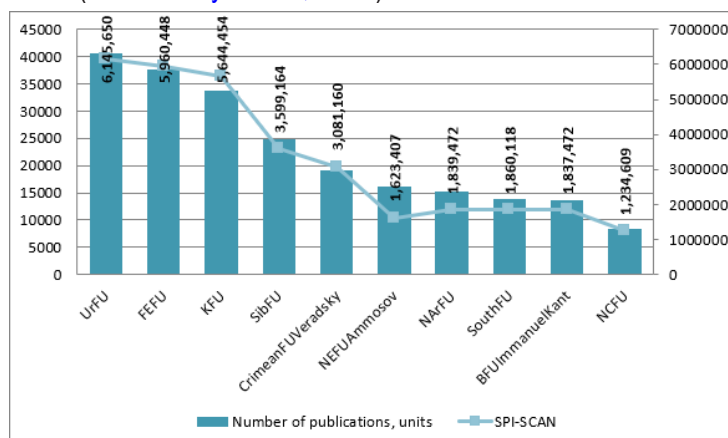


Figure 4. Publication activities in 2020. Leaders in terms of the number of publications.
Source: SCAN-Interfax

As in 2021, a new large-scale university development project called «Priority-2030» is being implemented in Russia. Table 8 presents the data on financing of federal universities in the project «Priority – 2030», determined by the Ministry of Internal Affairs of the Russian Federation for 2021 and 2022 according to the results of the contest. We also determined the amount of funding for the Project in the total budget of federal universities. On average, it amounted to about 8.4% of university budgets in 2020. However, if for BFUImmanuelKant this is ¼ of the total budget, then for NEFUAmosov it is less than 4%.

Table 8

Financing of national research universities that are project “Priority 2030” participants in 2021-2022

University	Project 5-100 (The Russian Academic Excellence Project) participant	Membership Status in «Priority 2030» ¹	The amount of funding in «Priority 2030» program, RUB mln	University budget in 2020, RUB mln	The share of fund- ing for the project in the university budget for 2020, %
UrFU	+	P2030-RL1	1194,5	10589,7	11,3
KFU	+	P2030-TAIL1	1194,5	10920,4	10,9
CrimeanFUVernadsky		P2030-TAIL2	626,2	3796,8	16,5
BFUImmanuelKant	+	P2030-TAIL2	626,2	2510,2	24,9
FEFU	+	P2030-TAIL2	626,2	10646,9	5,9
SouthFU		P2030-RL3	342,1	6198,6	5,5
SibFU	+	P2030-TAIL3	342,1	7699,4	4,4
NCFU		P2030	200,0	2587,4	7,7
NEFUAmosov		P2030	200,0	5624,0	3,6
NArFU			0,0	3188,9	0,0
Sum			5351,7	63762,3	8,4

¹Membership Status in «Priority 2030» - P2030 – «Priority 2030» membership, P2030-RL(n) – Research Leadership track, P2030-TAIL(n) – Territorial and (or) Industry Leadership track; n = 1, 2 or 3, - depending on getting into the group of universities that are winners of the track and the amount of funding. P2030-TAIL lacking n-index – that are universities that applied for participation in the territorial and (or) sectoral leadership tracks while not able to defend their programs and not receiving additional funding for the Project.

Source: compiled by the authors according to the Ministry of Science and Higher Education of the Russian Federation

Priority 2030 is a new program for Russia from an ideological point of view, therefore, the missions,

strategic goals of universities, the foresight of the image of the future of their university; these are not just beautiful slogans, but clearly built program documents. Strategic thinking is necessary when planning and investing resources at the university. The administration (project office) develops a strategic plan that carefully takes into account the needs of all stakeholders and results in their balance with financial and operational realities accordingly. In addition, the project office must constantly review and update its Strategic Plan to adapt to the rapidly changing operating environment.

Transformations are inevitable, so the Strategic Plan must be dynamic and flexible. The university's project office will continuously update priorities and initiatives to ensure that resources are focused on critical areas. The most important resource in the implementation of the transformation of the university is the team that took on the burden and responsibility for the reforms, it is this group that becomes the core of the entire team of like-minded people, the main forge of human capital.

Case NEFUAmosov

Mission of the university along with focus on its strengths and unique characteristics are of great importance for the development of a modern multifunctional and competitive higher education institution. In this connection, it is worth mentioning NEFUAmosov case. Based on information from open sources and our interviews with its representatives, it may be affirmed that this university, known in the past as the teachers college, has become the center of attraction for science, culture, public life of Yakutsk city and a big part of the Russian Far East district.

A unique research and development center, NEFUAmosov plays an important role in many aspects. First of all, it takes full advantage of its geographic location and difficult climate conditions of the region. Permafrost enables scientists to carry out large-scale archeological and paleontological studies, with mammoths as a separate research area. University academics are searching for ways to clone the extinct fossil species, as well as other representatives of ancient fauna preserved by nature. Cloning is not a long-term perspective and the information that has been collected up to now discloses amazing facts about the history of our planet and its inhabitants. In addition to that, the Sakha Republic needs specific and highly complicated piling construction projects, which require special technologies, design solutions, knowledge in material engineering and structural performance.

Finally, due to long isolation of Yakut ethnic group and the latest achievements of genetics and molecular biology, NEFUAmosov is actively involved in the development of genetic archeology – the new academic discipline that studies and reconstructs the most ancient genetic information of humans as its biological carriers. It is not going to replace the cultural aspect of archeological science, but the findings related to the genetic history of human population may be partly of interest for the solution of ethnogenesis and anthropology issues. In this way, NEFUAmosov competes with other leading Russian universities and demonstrates its scientific and technological achievements in under-investigated and unique research areas.

The limited size of the present article does not enable detailed description of the development and positioning features of all federal universities in Russia, but it is important that all ten federal universities continuously work on their own development strategies synchronized with economy development processes in federal districts.

Conclusion

High-profile federal universities have always played an important role in the hierarchy of modern Russian higher education institutions. Today's challenges affect the entire higher education system in Russia, and federal universities do not stay on the sidelines. It remains to be seen whether they will be able to follow the latest development trends and align with regional economy, but it is clear that only the accommodation of interests and joint efforts of academic community, government authorities and national high-tech business are able to generate synergy and promote the development of federal universities.

Quick and effective assessment of innovation and business environment in Russian federal universities requires universal multi-criteria methods of qualimetric analysis.

Acknowledgements

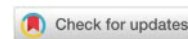
The article is prepared according to the results of studies carried out at the expense of budgetary funds on the state task of the Financial University.

Conflict of interests

The authors declare no conflict of interest.

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A Study of Primary School Teachers' Tendencies Regarding the Usefulness of Dramatization in the Educational Process

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Abstract: In this article, we attempt to examine the general teachers' attitudes towards dramatization and the differences that arise according to their major demographic elements, using inferential statistics methodology. Our sample consists of 60 (sixty) Greek teachers, of which 15 (fifteen) are male and 45 (forty-five) are female respondents. The teachers completed all questionnaire's statements correctly (without missing values), allowing us to draw valuable conclusions on both their knowledge and their perspectives regarding the usefulness of dramatization in a school environment and the necessity of its inclusion in the educational process. The analysis focuses both on the general teachers' tendencies and the existing differences that are caused according to the respondents' sex, age, years of experience and their willingness of working with immigrant students. Our analysis is carried out via the Mann-Whitney, Kruskal-Wallis and chi-square statistical tests. These statistical methods are ideal for the comparison of data resulting from questionnaires based on the Likert scale, providing trustworthy and valuable conclusions about the attitudes towards the inclusion of drama in the educational procedure. This paper reveals important existing differentiations in the viewpoints of Greek primary school teachers in terms of dramatization in education, while it brings out a quite positive attitude towards the benefits of including drama in the teaching process of primary schools.

Keywords: dramatization, education, pedagogy, Mann-Whitney U test, Kruskal-Wallis test, inferential statistics.

Introduction

Dramatization is a theatrical technique that can help pupils, better understand certain concepts, both within and outside the educational environment. 'Dramatopoesis', the Greek word for dramatization, is a compound word, formed by the words drama and poetry ('poesis' in Greek). The latter does not refer to its literary significance (poetry: the art of poems) but to its basic etymological meaning, namely: to make, to do, to construct. The first word is a derivative of the Greek verb 'dro', which means: I act, I do, I intervene; it should certainly not be confounded with its theatrical interpretation, which carries an emotional charge.

In this study, through the usage of a well-constructed questionnaire, we explore the tendencies of Greek primary school teachers, regarding the inclusion and beneficial effects of dramatization in the educational process. Special emphasis is placed on comparing their views based on sex, age, years of experience and their desire to work with immigrant students, using the Mann-Whitney U, Kruskal-Wallis and chi-square statistical tests, that are ideal for questionnaires based on Likert scale. The increased percentages of immigrants that have arrived in Greece during the last years, led us to also include in our analysis the examination of teachers' viewpoints with regard to their willingness of working with immigrant pupils in addition to the exploration of dissimilarities based on the aforementioned three demographic characteristics.

Related work includes studies that examine some aspects of the influence of dramatization in the educational process. [Şengün and İskenderoğlu \(2010\)](#) presented the analyses of 17 articles on the use of dramatization in the teaching of Mathematics; [Kayılı and Erdal \(2021\)](#) compared through the Mann-Whitney test the performance of 40 pupils, in order to examine whether dramatization enhances the understanding of preschool children, while [Momeni, Khaki and Amini \(2017\)](#) examine whether dramatization improves the creativity of 4-6 year-olds using a sample of 52 students. Furthermore, [Kilic and Namdar \(2021\)](#) assessed whether dramatization contributes to the acquisition of values in 5 year-old

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children. Finally, [Yaşar and Aral \(2012\)](#) examined whether the inclusion of dramatization in the education of children aged 61-72 months contributes to the development of creative thinking, while [Pesen and Üzümlü \(2017\)](#) looked at the self-efficacy levels of English teachers who used dramatization. Another widely used statistical tool that is adequate in the exploration of correlation between the answers of respondents in various questions, is the Spearman index that also belongs to the category of non-parametric statistical tests ([Papageorgiou and Tsaklidis, 2021](#)) rendering it ideal for the particularities of Likert scale.

This article is organized as follows: In the materials and methods section we emphasize the robustness of our questionnaire's reliability through the Cronbach's alpha index, while presenting the necessary characteristics of the statistical tests that we utilize during our analysis. In the results section we display the general tendencies of teachers towards dramatization in parallel with all the useful comparisons that take place in our analysis. Finally, we summarize the findings of our study, providing valuable conclusions for the differences in views of Greek teachers based on their demographic characteristics and their general positive attitude towards the beneficial effects of dramatization aiding the teaching process.

Materials and Methods

Questionnaire 's and statistical method's reliability

As we previously mentioned, this study is conducted with the usage of a well-constructed questionnaire, aiming to reveal the teachers' opinions for the utilization and helpfulness of dramatization in various aspects of the educational procedure. The questionnaire includes 24 questions-statements that utilize the five-level Likert scale aiming to provide a representative scheme of the examined phenomenon to the participants. The answers to the questions of the five-point Likert scale are coded with values ranging from 1 - 5, where higher values symbolize more positive answers to the questions-affirmations. Namely, values 1 – 5 represent options "Strongly Disagree", "Disagree", "Neither Agree nor Disagree", "Agree" and "Strongly Agree" correspondingly.

In this section, emphasis is placed on assessing the reliability of the questionnaire's measurement scale, through Cronbach's alpha coefficient, which returns values ranging from 0 to 1 ([Adeniran, 2019](#); [Tavakol and Dennick, 2011](#); [Taber, 2018](#)). The higher the value, the more reliable is the scale used in the questionnaire items. Values close to 1 are almost impossible in practice; therefore, researchers consider values greater than 0.5 as relatively acceptable, and those greater than 0.7 as extremely satisfactory. In our case, we have a Cronbach's alpha of 0.861 constituting a highly satisfactory value, which confirms the strong reliability of the used scale.

Inferential Statistics

The two non-parametric statistical tests of Mann-Whitney U ([Jingdong and Priebe, 2020](#); [Papageorgiou et al, 2022](#); [Kühnast and Neuhäuser, 2008](#)), Kruskal-Wallis ([Dalgaard, 2002](#); [Brown and Hettmansperger, 2002](#); [Winter and Dodou, 2010](#); [Ostertagová, Ostertag and Kováčet, 2014](#)) are more appropriate in cases of ordinal measurement scale data -such as Likert scale data- as they rely their functioning on order rather than mean values. Statistical methods that invoke the use of the sample mean value are best suited to analyze interval or ratio scale data.

In addition, we come to the selection of chi-square test due to its suitability of managing binary variables or variables with discrete number of options ([Holt, Scott and Ewings, 1980](#); [Franke, Ho and Christie, 2011](#); [Rao and Scott, 1981](#)); for example, variables-questions with only two possible answers (e.g. "Yes" or "No"). As a result, we are able to explore the existence of correlation between the willingness of primary school teachers to work with students that come from immigration according to the three demographic elements of gender, age and years of experience.

In the present analysis, we make extensive use of the generated p-values. The latter, represents the probability that the produced results are randomly generated and not due to a systemic factor ([Andrade, 2019](#); [Nahm, 2017](#); [Gao, 2020](#)). Thus, we realise that the lower the probability, the safer the conclusions drawn; p-values smaller than the selected significance level "α" signify that the results of statistical tests are not due to random factors. In our analysis, we use a significance level "α" of 0.05. For the statistical tests that take place in this paper we utilized the SPSS (Version 27.0.1.0) software.

Results

Comparison of perspectives based on sex

In this section, we examine the differences in views based on sex, via the Mann-Whitney U test. The variable "sex" is coded as "Male" = 0 and "Female" = 1; the examined sample consists of 45 male and 15 female primary school teachers that answered to all 24 questionnaire's statements. Figure 1 represents a pie chart of the distribution of male and female respondents in the sample.

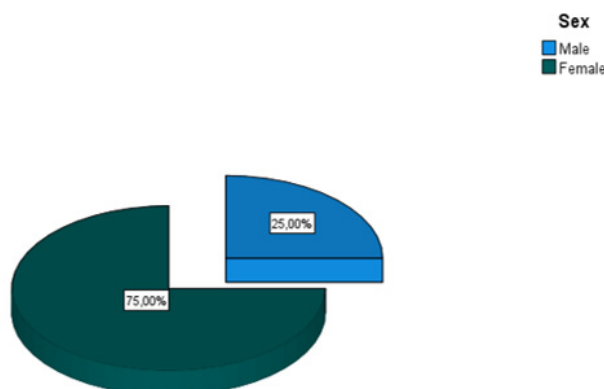


Figure 1. Pie chart presenting the sample's percentages of male and female primary school teachers

Tables 1a-d, illustrate the results of the Mann-Whitney U test. More specifically, the third column presents the number of respondents in each subgroup, the fourth and fifth show the mean value and standard deviation of each group respectively and the sixth column shows the statistical significance of the comparison (p-value). Generally speaking, the corresponding mean values (mean > 3) display positive tendencies towards the usefulness of dramatization's inclusion in the educational environment, regardless of their gender.

Table 1a

Comparison of teachers' views based on sex through the Mann - Whitney test

Teachers' Statements	Sex	N	Mean	Standard Deviation	p-value
1. Dramatization is an effective teaching method	Male	15	4.40	0.632	0.431
	Female	45	4.28	0.645	
2. Dramatization is widely used in the teaching of general classes	Male	15	3.07	0.884	0.836
	Female	45	3.02	0.917	
3. Dramatization is appropriate for teaching foreign-language pupils	Male	15	4.27	0.594	0.636
	Female	45	4.33	0.674	
4. Teachers are trained to use dramatization as a teaching method	Male	15	2.73	0.961	0.636
	Female	45	2.53	0.726	
5. Dramatization presupposes good use of the dominant language	Male	15	3.60	1.183	0.033
	Female	45	2.96	0.952	

Table 1b

	Teachers' Statements	Sex	N	Mean	Standard Deviation	p-value
6.	I have used dramatization in the teaching of the Greek language	Male	15	2.87	1.356	0.637
		Female	45	3.02	0.941	
7.	I use dramatization in the teaching of the Greek language	Male	15	2.67	1.397	0.363
		Female	45	2.96	1.021	
8.	I use dramatization in teaching courses other than the Greek language	Male	15	3.00	1.414	0.537
		Female	45	2.87	1.179	
9.	I create dramatization activities in addition to the content of the textbook	Male	15	2.93	1.223	0.837
		Female	45	2.82	1.007	
10.	I use dramatization when it is suggested by the Teacher's Handbook	Male	15	2.60	0.986	0.132
		Female	45	3.11	1.153	
11.	I would choose dramatization to make teaching more effective	Male	15	3.47	1.060	0.362
		Female	45	3.78	0.735	
12.	I would choose dramatization for more enjoyable teaching and easier learning	Male	15	3.93	1.163	0.970
		Female	45	4.09	0.583	

Table 1c

	Pupils, through dramatization...	Sex	N	Mean	Standard Deviation	p-value
13.	Expand life and learning experiences	Male	15	4.07	0.704	0.698
		Female	45	3.96	0.767	
14.	Gather information about the "Other"	Male	15	3.87	0.834	0.630
		Female	45	3.93	0.720	
15.	Develop their language skills	Male	15	4.00	0.535	0.912
		Female	45	4.00	0.674	
16.	Release emotional charge	Male	15	4.20	0.676	0.123
		Female	45	4.44	0.813	
17.	Develop democratic relationships within the classroom and the school environment	Male	15	3.93	0.704	0.704
		Female	45	4.00	0.769	
18.	Feel creative	Male	15	4.13	0.743	0.040
		Female	45	4.56	0.586	

Table 1d

Pupils, through dramatization...	Sex	N	Mean	Standard Deviation	p-value
19. Combine relaxation and creativity	Male	15	4.13	0.743	0.108
	Female	45	4.47	0.661	
20. Develop motor skills	Male	15	4.20	0.561	0.896
	Female	45	4.18	0.777	
21. Discover and develop their senses	Male	15	4.13	0.640	0.613
	Female	45	4.22	0.704	
22. Stimulate their imagination	Male	15	4.60	0.507	0.904
	Female	45	4.58	0.621	
23. Set aside inhibitions and phobias	Male	15	4.13	0.834	0.772
	Female	45	4.04	0.796	
24. Socialise	Male	15	4.33	0.816	0.703
	Female	45	4.44	0.693	

By observing the generated p-values of tables 1a-d, we pay attention to the statements "Dramatization presupposes good use of the dominant language" and "Pupils, through dramatization feel creative", with ($U = 217.5, p = 0.033 < 0.05$) and ($U = 230.5, p = 0.04 < 0.05$), respectively. In the case of the statement "Dramatization presupposes good use of the dominant language", the views of men (mean = 3.6) seem to be more positive compared to those of women, that display a mean value of 2.96. The value of 3.6 indicates that viewpoints of men converge closer to the option "Agree", while the views of women concentrate on the moderate answer "Neither agree nor disagree".

Furthermore, the female teachers who participated in the research seem to believe more strongly that dramatization contributes beneficially to the stimulation of children's creativity, as the mean value of their answers to the corresponding question is 4.56, compared to 4.13, which is the average of male teachers' responses. No difference in the views of men and women emerge in the remaining items, as illustrated by the respective p-values, which are greater than 0.05.

Comparison of perspectives based on age

Here, we examine the differences of teachers' opinions in relation to their age, with the help of the Kruskal-Wallis non-parametric test. The variable age is coded as "25 – 30" = 1, "31 – 40" = 2 and "41+" = 3. The initial questionnaire had four age groups; however, due to the small number of participants, the age groups 41 – 40 and 50+ were concatenated and given the code 3. The sample consists of 19 primary school teachers that their age is between 25 and 30, 25 that their age is between 31 and 40 years and 17 that they are over 40 years old. Figure 2 displays a pie chart of the participants' age distribution.

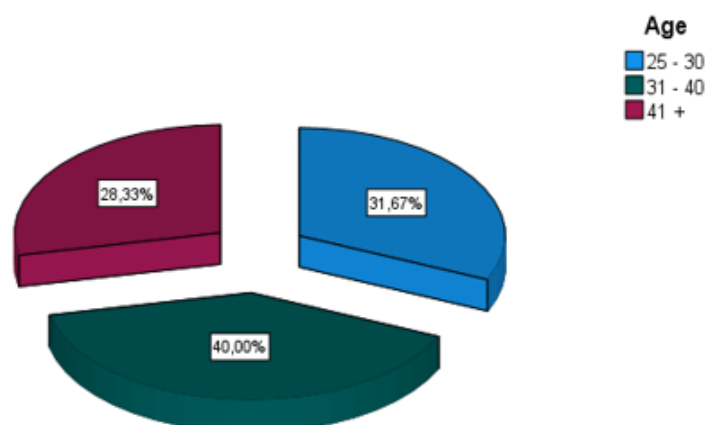


Figure 2. Pie chart presenting the respondents' age distribution

Tables 2a-d, record the results of the Kruskal-Wallis test based on the constructed questionnaire. Generally, the displayed mean values (mean > 3) show positive tendencies of primary school teachers towards the usefulness and the inclusion of dramatization in the everyday educational environment, regardless of their age. Especially for statements like "Dramatization is appropriate for teaching foreign-language pupils", "Pupils, through dramatization release emotional charge", "Pupils, through dramatization combine relaxation and creativity" and "Pupils, though dramatization discover and develop their senses" the respective average values are even greater than 4 that corresponds to the option "Agree".

Table 2a

Comparison of teachers' views based on age, using Kruskal-Wallis non-parametric statistical test

Teachers' Statements	Age Group	N	Mean	Standard Deviation	p-value
1. Dramatization is an effective teaching method	25 - 30	19	4.00	0.667	0.092
	31 - 40	24	4.38	0.647	
	41 +	17	4.47	0.514	
2. Dramatization is widely used in the teaching of general classes	25 - 30	19	2.84	0.834	0.147
	31 - 40	24	3.33	0.917	
	41 +	17	2.82	0.883	
3. Dramatization is appropriate for teaching foreign-language pupils	25 - 30	19	4.32	0.749	0.934
	31 - 40	24	4.33	0.702	
	41 +	17	4.29	0.470	
4. Teachers are trained to use dramatization as a teaching method	25 - 30	19	2.47	0.513	0.118
	31 - 40	24	2.88	0.947	
	41 +	17	2.29	0.686	
5. Dramatization presupposes good use of the dominant language	25 - 30	19	2.79	0.855	0.097
	31 - 40	24	3.42	1.060	
	41 +	17	3.06	1.144	

Table 2b

Teachers' Statements	Age Group	N	Mean	Standard Deviation	p-value
6. I have used dramatization in the teaching of the Greek language	25 - 30	19	2.74	0.933	0.290
	31 - 40	24	3.13	1.154	
	41 +	17	3.00	1.029	
7. I use dramatization in the teaching of the Greek language	25 - 30	19	2.63	1.065	0.262
	31 - 40	24	3.17	1.204	
	41 +	17	2.76	1.033	
8. I use dramatization in teaching courses other than the Greek language	25 - 30	19	2.58	1.071	0.240
	31 - 40	24	3.08	1.139	
	41 +	17	3.00	1.500	
9. I create dramatization activities in addition to the content of the textbook	25 - 30	19	2.68	0.946	0.342
	31 - 40	24	2.79	1.062	
	41 +	17	3.12	1.166	
10. I use dramatization when it is suggested by the Teacher's Handbook	25 - 30	19	2.89	0.994	0.757
	31 - 40	24	3.00	1.351	
	41 +	17	3.06	0.966	
11. I would choose dramatization to make teaching more effective	25 - 30	19	3.63	0.831	0.260
	31 - 40	24	3.58	0.929	
	41 +	17	3.94	0.659	
12. I would choose dramatization for more enjoyable teaching and easier learning	25 - 30	19	3.84	0.834	0.036
	31 - 40	24	3.92	0.974	
	41 +	17	4.47	0.624	

Table 2c

Pupils, through dramatization...	Age Group	N	Mean	Standard Deviation	p-value
13. Expand life and learning experiences	25 - 30	19	3.89	0.737	0.730
	31 - 40	24	4.04	0.690	
	41 +	17	4.00	0.866	
14. Gather information about the "Other"	25 - 30	19	3.84	0.898	0.935
	31 - 40	24	3.96	0.624	
	41 +	17	3.94	0.748	
15. Develop their language skills	25 - 30	19	4.00	0.745	0.970
	31 - 40	24	4.00	0.590	
	41 +	17	4.00	0.612	
16. Release emotional charge	25 - 30	19	4.26	0.872	0.677
	31 - 40	24	4.42	0.776	
	41 +	17	4.47	0.717	
17. Develop democratic relationships within the classroom and the school environment	25 - 30	19	3.89	0.809	0.744
	31 - 40	24	4.04	0.751	
	41 +	17	4.00	0.707	
18. Feel creative	25 - 30	19	4.37	0.684	0.717
	31 - 40	24	4.54	0.588	
	41 +	17	4.41	0.712	

Table 2d

Pupils, through dramatization...	Age Group	N	Mean	Standard Deviation	p-value
19. Combine relaxation and creativity	25 - 30	19	4.26	0.653	0.318
	31 - 40	24	4.54	0.658	
	41 +	17	4.29	0.772	
20. Develop motor skills	25 - 30	19	3.89	0.737	0.048
	31 - 40	24	4.21	0.721	
	41 +	17	4.47	0.624	
21. Discover and develop their senses	25 - 30	19	3.95	0.621	0.020
	31 - 40	24	4.21	0.658	
	41 +	17	4.47	0.717	
22. Stimulate their imagination	25 - 30	19	4.42	0.692	0.305
	31 - 40	24	4.63	0.576	
	41 +	17	4.71	0.470	
23. Set aside inhibitions and phobias	25 - 30	19	3.84	0.834	0.146
	31 - 40	24	4.04	0.751	
	41 +	17	4.35	0.786	
24. Socialise	25 - 30	19	4.16	0.834	0.139
	31 - 40	24	4.50	0.590	
	41 +	17	4.59	0.712	

For the statement "I would choose dramatization for more enjoyable teaching and easier learning", we obtain $\eta = 6.672$ and $p = 0.036 < 0.05$. Therefore, there is a difference in teachers' viewpoints based on age. Teachers aged "41+" seem to be more open to the use of dramatization, aiming to conduct a more enjoyable and constructive educational process (mean value = 3.98), as their views converge on the "Agree" option, in contrast to the views of the "25 - 30" and "31 - 40" age groups that have more moderate opinions. Also, there is a statistically significant difference among teachers' perspectives, as to whether pupils develop their motor skills through dramatization ($\eta = 6.604$, $p = 0.048 < 0.05$). Teachers aged "41+" are more supportive of the view that dramatization develops pupils' motor skills (mean =

4.47), compared to the "31-40" (mean = 4.21) and the "25-30" group (mean = 3.89). Finally, a significant difference is observed in the tendencies regarding the development and advancement of pupils' senses through dramatization, with $\eta = 7.796$ and $p = 0.02 < 0.05$. The conclusions drawn are similar to the above, as the average values that we obtain are 3.95 and 4.21 and 4.47 respectively, for the three groups. However, even in cases where we do not encounter significant divergences, the age group of 41+ have the greater scores in the majority of the statements.

Comparison of perspectives based on years of experience

At this point, the difference in the perspectives of the teachers who participated in the research according to their years of experience is being examined. The variable "years of experience" is coded as "1 – 6" = 1, "7 – 12" = 2, "13 – 18" = 3 and "19+" = 4. In the original questionnaire there are five groups for this variable, however due to the small number of participants, the subgroups "19 – 23" and "23+" are merged into "19+" group, which is coded with 4. Specifically, the sample consists of 14 primary school teachers with 1-6, 26 with 7-12, 12 with 13-18 and 8 with over 18 years of experience. The respective mean values (mean > 3) display positive attitudes towards the usefulness of dramatization's inclusion in primary school education, regardless of their years of experience. Especially, according to Tables 3a-d, for statements such as "Pupils, through dramatization feel creative", "Pupils, through dramatization socialize" and "Pupils, through dramatization, stimulate their imagination" etc. we observe average values even greater than 4 regardless of the respondents' years of experience. Figure 3 displays a pie chart of the participants' years of experience distribution.

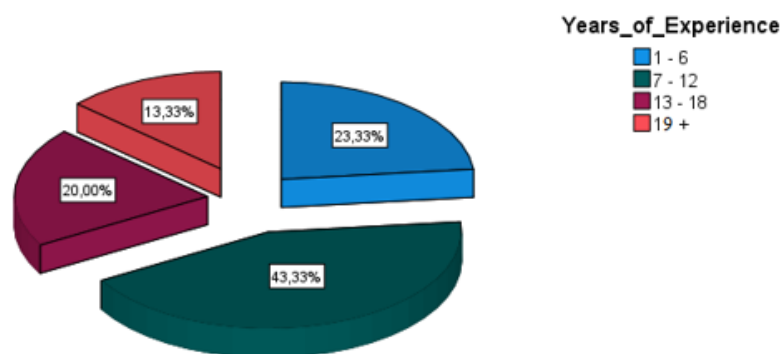


Figure 3. Pie chart presenting the distribution of respondents' teaching experience

Significant difference appears in the statement "Dramatization is widely used in the teaching of general classes" with $\eta = 10.005$ and $p - \text{value} = 0.019 < 0.05$. This result is due to the dissimilarities in the teachers' views with "7 – 12" and "13 – 18" years of experience in relation to the opinions of the other two groups. More specifically, the mean values 3.35 of group "7 – 12" and 3.17 of group "13 – 18", indicate a much more moderate attitude according to whether dramatization is used in general education classes, while teachers with "1 – 6" and "19+" years of experience are between the "Disagree" and the moderate choice, with averages of 2.57 and 2.63 respectively.

Table 3a
Comparison of teachers' views based on years of experience, according to non-parametric Kruskal-Wallis statistical test

Teachers' Statements	Years of Experience	N	Mean	Standard Deviation	p-value
1. Dramatization is an effective teaching method	1 - 6	14	4.29	0.611	0.115
	7 - 12	26	4.08	0.688	
	13 - 18	12	4.50	0.522	
	19+	8	4.63	0.518	
2. Dramatization is widely used in the teaching of general classes	1 - 6	14	2.57	0.756	0.019
	7 - 12	26	3.35	0.892	
	13 - 18	12	3.17	0.718	
	19+	8	2.63	1.061	
3. Dramatization is appropriate for teaching foreign-language pupils	1 - 6	14	4.43	0.756	0.470
	7 - 12	26	4.19	0.694	
	13 - 18	12	4.50	0.522	
	19+	8	4.25	0.463	
4. Teachers are trained to use dramatization as a teaching method	1 - 6	14	2.71	0.914	0.895
	7 - 12	26	2.54	0.582	
	13 - 18	12	2.58	0.793	
	19+	8	2.50	1.195	
5. Dramatization presupposes good use of the dominant language	1 - 6	14	2.86	1.027	0.354
	7 - 12	26	3.27	0.962	
	13 - 18	12	2.83	0.937	
	19+	8	3.50	1.414	

Table 3b

Teachers' Statements	Years of Experience	N	Mean	Standard Deviation	p-value
6. I have used dramatization in the teaching of the Greek language	1 – 6	14	2.50	1.160	0.100
	7 – 12	26	3.19	0.981	
	13 – 18	12	2.83	1.115	
	19+	8	3.38	0.744	
7. I use dramatization in the teaching of the Greek language	1 – 6	14	2.43	1.222	0.098
	7 – 12	26	3.19	1.059	
	13 – 18	12	2.50	1.087	
	19+	8	3.25	0.886	
8. I use dramatization in teaching courses other than the Greek language	1 – 6	14	2.93	1.072	0.410
	7 – 12	26	2.69	1.192	
	13 – 18	12	2.92	1.379	
	19+	8	3.50	1.414	
9. I create dramatization activities in addition to the content of the textbook	1 – 6	14	2.86	0.949	0.360
	7 – 12	26	2.65	0.977	
	13 – 18	12	2.83	1.115	
	19+	8	3.50	1.309	
10. I use dramatization when it is suggested by the Teacher's Handbook	1 – 6	14	2.57	1.222	0.257
	7 – 12	26	3.12	1.143	
	13 – 18	12	2.83	0.937	
	19+	8	3.50	1.069	
11. I would choose dramatization to make teaching more effective	1 – 6	14	3.71	0.994	0.564
	7 – 12	26	3.62	0.752	
	13 – 18	12	3.67	0.985	
	19+	8	4.00	0.535	
12. I would choose dramatization for more enjoyable teaching and easier learning	1 – 6	14	3.93	1.072	0.153
	7 – 12	26	3.92	0.796	
	13 – 18	12	4.08	0.900	
	19+	8	4.63	0.518	

Table 3c

Pupils, through dramatization...	Years of Experience	N	Mean	Standard Deviation	p-value
13. Expand life and learning experiences	1 – 6	14	4.36	0.497	0.026
	7 – 12	26	3.65	0.745	
	13 – 18	12	4.17	0.718	
	19+	8	4.13	0.835	
14. Gather information about the "Other"	1 – 6	14	4.36	0.497	0.043
	7 – 12	26	3.65	0.797	
	13 – 18	12	3.92	0.669	
	19+	8	4.00	0.756	
15. Develop their language skills	1 – 6	14	4.29	0.611	0.144
	7 – 12	26	3.81	0.634	
	13 – 18	12	4.00	0.426	
	19+	8	4.13	0.835	
16. Release emotional charge	1 – 6	14	4.71	0.469	0.231
	7 – 12	26	4.15	0.925	
	13 – 18	12	4.50	0.674	
	19+	8	4.38	0.744	
17. Develop democratic relationships within the classroom and the school environment	1 – 6	14	4.21	0.802	0.423
	7 – 12	26	3.81	0.749	
	13 – 18	12	4.08	0.793	
	19+	8	4.00	0.535	
18. Feel creative	1 – 6	14	4.64	0.497	0.629
	7 – 12	26	4.38	0.637	
	13 – 18	12	4.33	0.778	
	19+	8	4.50	0.756	

Table 3d

Pupils, through dramatization...	Years of Experience	N	Mean	Standard Deviation	p-value
19. Combine relaxation and creativity	1 – 6	14	4.50	0.519	0.947
	7 – 12	26	4.38	0.697	
	13 – 18	12	4.25	0.866	
	19+	8	4.38	0.744	
20. Develop motor skills	1 – 6	14	3.93	0.829	0.217
	7 – 12	26	4.12	0.711	
	13 – 18	12	4.50	0.522	
	19+	8	4.38	0.744	
21. Discover and develop their senses	1 – 6	14	4.00	0.679	0.303
	7 – 12	26	4.15	0.675	
	13 – 18	12	4.50	0.522	
	19+	8	4.25	0.886	
22. Stimulate their imagination	1 – 6	14	4.04	0.497	0.678
	7 – 12	26	4.46	0.706	
	13 – 18	12	4.75	0.452	
	19+	8	4.63	0.518	
23. Set aside inhibitions and phobias	1 – 6	14	4.07	0.917	0.351
	7 – 12	26	4.00	0.693	
	13 – 18	12	3.92	0.900	
	19+	8	4.50	0.756	
24. Socialise	1 – 6	14	4.57	0.514	0.678
	7 – 12	26	4.27	0.827	
	13 – 18	12	4.42	0.793	
	19+	8	4.63	0.518	

Regarding the statement “Pupils through dramatization, expand the life and learning experiences”, there is a statistically significant difference with $\eta = 9.260$ and $p\text{-value} = 0.026 < 0.05$. Essentially, the group that differs significantly from the rest is that of “7 – 12” years of experience, which seems to be between the options “Neither Agree nor Disagree” and “Agree” with an average of 3.65, while the other groups clearly agree with this statement. Finally, differentiated answers appear in the statement that elementary school students collect information about the “other” through dramatization with $\eta = 8.156$ and $p\text{-value} = 0.043 < 0.05$. The answers of teachers with “7 – 12” years of experience seem to have been divided between the options “Neither Agree nor Disagree” and “Agree” with an average of 3.65. At the same time, the other three groups converge to the “Agree” option with averages of 3.92 and 4 for the “13 – 18” and “19+” groups, while the teachers who belong to the “1-6” category have the highest average value of 4.36.

Comparison of views according to the willingness of teachers to work with immigrant students

Following the completion of the statistical analysis concerning the differentiation of the views of the teachers participating in the research, based on their gender, age and years of experience, we explore whether and how their opinions have been influenced in terms of their desire to work with immigrant students in their classes. For this purpose, a Mann-Whitney test is performed for each statement, as we have two subgroups, those who wish to work with immigrant pupils, coded with 1 and those who do not,

coded with 0. In our study, 31 of the 60 participating teachers stated that they would not like to work with immigrants, while the remaining 29 display opposite opinion, giving us a highly balanced sample of the feature that is under consideration. Figure 4 displays a pie chart of the respondents' willingness of working with immigrant students.

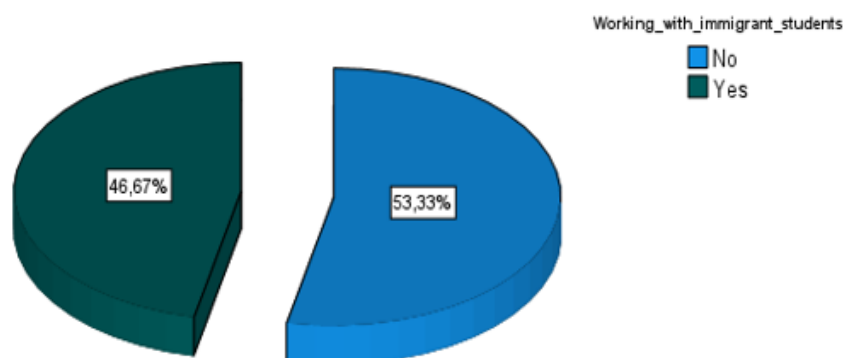


Figure 4. Pie chart presenting the percentages of teachers' willingness to working with immigrant students

Tables 4a-d display the corresponding results of the non-parametric Mann-Whitney U test. Regarding the question "Pupils, through dramatization release emotional charge", there is a statistically significant difference between the answers of the two examined groups ($U = 295$, $p\text{-value} = 0.011 < 0.05$). Looking at the 4th column of the results of table 4c, someone may realize that the teachers who are willing to work with immigrants, strongly support the usefulness of dramatization in the part of students' emotional discharge (mean = 4.66), as their answers seem to tend to the "Strongly agree" option, illustrating a highly positive attitude towards the advantages of dramatization. On the other hand, the views of teachers who do not desire to work with immigrant pupils are closer to the option "Agree" (mean = 4.13).

Table 4a

Comparison of teachers' views according to their willingness of working with immigrant students through the Mann - Whitney test

Teachers' Statements	I would like to work with immigrant students	N	Mean	Standard Deviation	p-value
1. Dramatization is an effective teaching method	No	31	4.23	0.669	0.504
	Yes	29	4.34	0.614	
2. Dramatization is widely used in the teaching of general classes	No	31	3.10	0.012	0.796
	Yes	29	2.97	0.778	
3. Dramatization is appropriate for teaching foreign-language pupils	No	31	4.23	0.669	0.289
	Yes	29	4.41	0.628	
4. Teachers are trained to use dramatization as a teaching method	No	31	2.55	0.810	0.455
	Yes	29	2.62	0.775	
5. Dramatization presupposes good use of the dominant language	No	31	3.29	1.101	0.131
	Yes	29	2.93	0.961	

Table 4b

Teachers' Statements	I would like to work		N	Mean	Standard Deviation	p-value
	with immigrant students					
6. I have used dramatization in the teaching of the Greek language	No	31	2.97	1.110	0.987	
	Yes	29	3.00	1.000		
7. I use dramatization in the teaching of the Greek language	No	31	2.87	1.231	0.773	
	Yes	29	2.90	1.012		
8. I use dramatization in teaching courses other than the Greek language	No	31	2.87	1.284	0.807	
	Yes	29	2.93	1.193		
9. I create dramatization activities in addition to the content of the text-book	No	31	2.77	1.230	0.254	
	Yes	29	2.93	0.842		
10. I use dramatization when it is suggested by the Teacher's Handbook	No	31	3.06	1.289	0.541	
	Yes	29	2.90	0.939		
11. I would choose dramatization to make teaching more effective	No	31	3.61	0.989	0.497	
	Yes	29	3.79	0.620		
12. I would choose dramatization for more enjoyable teaching and easier learning	No	31	4.00	1.033	0.943	
	Yes	29	4.10	0.673		

Table 4c

Pupils, through dramatization...	I would like to work with immigrant students	N	Mean	Standard Deviation	p-value
13. Expand life and learning experiences	No	31	3.81	0.873	0.082
	Yes	29	4.17	0.539	
14. Gather information about the "Other"	No	31	3.74	0.815	0.074
	Yes	29	4.10	0.618	
15. Develop their language skills	No	31	3.90	0.700	0.267
	Yes	29	4.10	0.557	
16. Release emotional charge	No	31	4.13	0.885	0.011
	Yes	29	4.66	0.553	
17. Develop democratic relationships within the classroom and the school environment	No	31	3.81	0.749	0.065
	Yes	29	4.17	0.711	
18. Feel creative	No	31	4.26	0.682	0.016
	Yes	29	4.66	0.553	

Table 4d

Pupils, through dramatization...	I would like to work with immigrant students	N	Mean	Standard Deviation	p-value
19. Combine relaxation and creativity	No	31	4.32	0.748	0.578
	Yes	29	4.45	0.632	
20. Develop motor skills	No	31	4.16	0.688	0.673
	Yes	29	4.21	0.774	
21. Discover and develop their senses	No	31	4.19	0.749	0.961
	Yes	29	4.21	0.620	
22. Stimulate their imagination	No	31	4.52	0.677	0.552
	Yes	29	4.66	0.484	
23. Set aside inhibitions and phobias	No	31	4.13	0.763	0.597
	Yes	29	4.00	0.845	
24. Socialise	No	31	4.32	0.791	0.385
	Yes	29	4.52	0.634	

Quite important is the difference between the two groups in terms of whether students feel creative through the process of dramatization during class ($U = 305$, p -value = $0.016 < 0.05$). The interpretation does not differ much from that of the previous comparison. Once again, the teachers who are positive about the reception classes, support to a greater extent the importance of dramatization in the modern educational environment. Although, this interpretation should not lead us to the conclusion that the respondents who do not wish to work with immigrants do not support dramatization, as their average value is still greater than 4.

Examining the correlation of the willingness of the primary school teachers to work with immigrant students according to their sex, age and years of experience

Finally, we explore through the statistical test of chi - square, the possibility that the views of the participating teachers differ based on whether they want to work with immigrant students in accordance with their sex, age and years of experience. The hypothesis of 20% is valid for our sample; hence we can continue our analysis without cell fusion ([McHugh 2013](#)).

Table 5

Chi-square test for the willingness of teachers in working with immigrant students in comparison with their sex, age and years of experience

		I would like to work with immigrant students				p – value
		No		Yes		
		N	%	N	%	
Sex	Male	12	20.0%	3	5.0%	0.016
	Female	19	31.7%	26	43.3%	
Age	25 - 30	6	10.0%	13	21.7%	0.103
	31 - 40	15	25.0%	9	15.0%	
	41 +	10	16.7%	7	11.7%	
Years of Experience	1 - 6	2	3.3%	12	20.0%	0.010
	7 - 12	18	30.0%	8	13.3%	
	13 - 18	6	10.0%	6	10.0%	
	19+	5	8.3%	3	5.0%	

According to the results of table 5, there is a statistically significant difference in teachers' views in 2 out of 3 examined demographic factors. Initially, there is no statistical difference regarding the age factor ($\chi^2 = 4.547$, $p - \text{value} = 0.103 > 0.05$). Although, in terms of teachers' views according to their gender, we notice that there is a significant difference as $\chi^2 = 6.429$ and $p - \text{value} = 0.016 < 0.05$. In fact, observing the percentages listed in table 5, we realize that the opinions of female teachers on whether they want to work with immigrants, resemble a much more open-minded attitude as 31.7% of them selected "No" and 43.3% "Yes" (based on the cumulative number of participants), in contrast with men who clearly leaned towards the option "No", since the percentage of male teachers who do not want to work with immigrants is four times the percentage of those who support this statement (20% selected No and 5% 'Yes' based on the cumulative number of participants).

Difference is also observed in the perspectives regarding the variable years of experience ($\chi^2 = 11.435$, $p - \text{value} = 0.01 < 0.05$), where the percentage of teachers who support working with immigrant pupils is six times greater than the respective percentage of non-supporters, for 1-6 years of experience (3.3% chose "No" and 20.0% "Yes" based on the cumulative sample). On the other hand, the attitude of teachers with 7-12 years of experience seems to be negative (30.0% chose 'No' and 13.3% 'Yes'), while the views of the other two groups are quite more balanced. Hence, it may be concluded that the attitude of teachers towards immigrant pupils, depend on their gender and years of experience.

Discussions

In this paper we explore the perspectives of primary school teachers about the benefits of including dramatization during the educational procedure, as many believe that students through this teaching method develop important skills such as language and motor skills, improve aspects of their personality like creativity, communication and socialization while they stimulate their imagination and reduce the existing stress levels. During our analysis, and with the aid of a well-constructed questionnaire, we generally encounter a quite positive attitude towards dramatization, as the majority of choices leads to averages around the value of 4 that in all the questionnaire's statements signifies positive tendencies in parallel with acknowledgment for the valuable effects of this methodology.

More specifically, during the presented comparisons of respondents' views according to their demographic characteristics like gender, age and years of experience, there are statements where all the participants' groups display highly encouraging tendencies, producing mean values even greater than 4. Characteristic examples are statements like "Dramatization is an effective teaching method", "Dramatization is appropriate for teaching foreign language pupils", "Pupils, through dramatization release emotional charge" etc. where both male and female teachers present averages greater than 4. Moreover, for statements such as "Pupils, through dramatization, stimulate their imagination", "Pupils, through dramatization feel creative" and "Pupils, through dramatization socialize" we observe average values greater than 4 regardless of the respondents' years of experience. We also encounter a similar behavior for the comparisons according to the respondents' age, with instances like "Pupils, through dramatization release emotional charge", "Pupils, through dramatization combine relaxation and creativity", "Pupils, through dramatization discover and develop their senses" etc. provide a characteristic image of the positive attitude towards drama in the educational environment.

As for the comparisons based on the participants' sex, we cannot assume differentiations in viewpoints between the 2 genders as their perceptions about dramatization reveal only minor divergencies. Regarding the years of experience, we also observe minor differences, where the group of teachers with 7 – 12 years of experience produces statistically significant dissimilarities. Another observation about this specific part of analysis is that the groups with more years of experience - namely the groups 13 – 18 and 19+ - display slightly more positive tendencies towards dramatization. In parallel, a quite important pattern is derived from the exploration of the views of the 3 age groups. In all cases where we encounter statistically significant differentiations, the age group of 41+ is the group that causes these dissimilarities, believing to a greater extent into the advantages that the dramatization provide in the learning procedure of primary schools. Also, in the majority of statements without significant differences, the option values of the 41+ subgroup are the most prevalent. In combination with the comment about the comparison based on years of experience, older and more experienced teachers reveal their appreciation to the dramatization's effects on pupils while being more dialectical towards the inclusion of this methodology to their teaching arsenal. Perhaps during the years working in education, they searched or tested these techniques, realizing many of the benefits that the questionnaire states, thus justifying their highly open-minded attitude.

After the above part of analysis, we proceed to the description of the teachers' tendencies according to their willingness to work with immigrant pupils. We deem that this part of analysis is quite interesting and topical due to the increased percentages of immigrants that have arrived in Greece during the last years. Teachers wishing to work with immigrant students, highly encourage the usage of drama in classrooms showing that they are characterized of more modern and unprejudiced opinions, while in cases where they have faced the challenge of teaching foreign language students, dramatization may have constituted a really useful aid in their work. Finally, through the chi-square test, we conclude that there is correlation in whether teachers want to include immigrants in their classes, according to their gender, where female teachers show a much less conservative confrontation of the phenomenon, while the 2 group of teachers with more experience display a much more balanced distribution compared to the remaining ones.

Conclusions

This study aims to examine the views of Greek primary education teachers, regarding the inclusion and usefulness of dramatization in the educational process. Firstly, according to their general responses, we found that, indeed, dramatization is a technique that significantly helps teachers in their lessons regardless of specialty. More and more teachers acknowledge the beneficial effects of this alternative teaching methodology that significantly helps students to develop and improve important characteristics like creativity, language, motor and social skills.

The ordinal scale used in the questionnaire, leads us to the utilization of Mann-Whitney U and Kruskal-Wallis non-parametric statistical tests. These two statistical tests help us to ascertain differences in views on specific questions-statements, while via descriptive statistics we draw further conclusions regarding the opinions of each group. According to the results presented in the above analysis, there are minor differences in the teachers' views based on their gender, while older and more experienced teachers seem to encourage to a greater extent the beneficial effects of dramatization in the educational environment. Simultaneously, teachers that are more open into working with immigrants follow the tendencies of the older and more experienced groups displaying even more open-minded and dialectic attitudes. Although, we should not conclude that the other examined participants' groups do not appreciate the aforementioned methods, as there are numerous examples of statements where all respondents' categories are clearly in favor of dramatization as a teaching technique.

The chi-square test enables us to examine the differences in the willingness of teachers to work with immigrant students according to their three abovementioned demographic elements, providing a highly representative image of the impact of teachers' sex, age and years of experience to their tendencies towards students from other countries. Finally, the presented methodology is ideal in order to manage and utilize questionnaire results, while it helps draw quite interesting and valuable conclusions about the attitudes of primary school teachers against the inclusion of drama in the educational process. It can be easily implemented in a similar way to conduct trustworthy studies in the broader field of education, and even in cases that examine the integration of different types of art therein in the teaching procedure.

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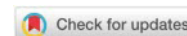
Conflict of interests

The author declares no conflict of interest.

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Brain Mechanisms of Embodied Decision-Making

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Abstract: One of the ways to comprehend mental abilities of individuals is to examine their underlying neural processes and mechanisms. To explore the role of cingulate cortical neurons in “mental rehearsal” immediately before every trial of appetitive instrumental task in well-trained animals, we analyzed recorded single-unit activity in relation to the task-relevant events during task trials and during delay periods inside each trial in the same animals. The results showed that neuronal activity in the rabbit posterior cingulate cortex during the delay consisted mostly of activity of those neurons which were specialized in relation to this task, though the delay periods were not intended to remember previous events. The data indicated that these neuronal groups are involved in the processes of unfolding planned future behavior. Sequences of neuronal events during the delay period (i.e. during “covert behavior” phase), used for decision making, depended on the role of neuron in overt behavior. During delay periods replays (or preplays) started with activity of very selective (“narrow selective”) neurons, specialized in relation to concrete behavioral acts, but late in the delay included activity of such “broadly selective” neurons which might have been related to movements similar in broad categories of behavior. Such results indicate that task-related neurons with different degree of selectivity are all involved in overt and covert phase of experience actualization, which might imply that decision making in rabbits is the embodied cognitive process.

Keywords: *mental rehearsal, embodied cognition, posterior cingulate cortex, rabbit, decision making.*

Introduction

How any organism selects an action among multiple alternatives is the biggest question in psychobiology and neuroscience. Decision making studies show that these processes, though in different applications, still share common elements including deliberation and commitment (Gold and Shadlen 2007), and in this sense this question is closely related to the phenomenon of mental rehearsal. According to Dennet (1996), reactivation of overt behavior in the inner environment has an evolutionary advantage.

Deliberation may include both action preparation and expected consequences of actions (e.g., Anokhin 1974; van der Meer and Redish 2010). One hypothesis is that action preparation is based on low pre-activation of the same neurons that are related to the movement itself (Murakami and Mainen 2015). In this case a neuron related to some movement appears to gradually increase its activity at subthreshold level during decision period and demonstrate a constant high level of activation just before the action (e.g. Gold and Shadlen 2007), but it is not might be always the case. At the same time, low-frequency activity was also noted during decision making periods. Replays as low-frequency neuronal activity occur during awake rest periods (e.g. Foster and Wilson 2006; Singer et al. 2013) and sleep (e.g. O'Neill et al. 2010). Such replays of activity during rest periods is evident also in immediate early gene transcription patterns (e.g. Arc), which reoccurs partly in those task-related neurons that were active during the deployment of overt behavior itself (Gheidi, Satvat and Marrone, 2012).

Task-related neurons in many cortical areas of the brain often exhibit the same activity patterns during delay periods before any actual motions as during the movement itself (e.g. Cisek and Kalaska 2004). Such activities might be a neuronal basis of covert mental rehearsal (Cisek and Kalaska 2004). This mental rehearsal might be related to the movements themselves or to more abstract information, which is not directly linked to movements per se (Freedman and Assad 2011). Motor imagery (the mental

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rehearsal of movement) may even result in learning without prior practice (Ingram et al., 2016). Most paradigms in which such neuronal activity is analyzed consists of delay periods between a sample and a target (e.g. Bisley et al., 2004), and in such cases neuronal activities often reflect properties of a sample memorized, namely working memory.

Neurons of many areas across many species show in delay periods activity related to goals, intended movements, trajectories: for example, frontal and parietal cortical neurons (Andersen and Cui, 2009; Park et al., 2014), motor cortical neurons (Churchland et al., 2010), premotor cortical neurons (Crammond and Kalaska, 2000), hippocampal neurons (Catanese et al., 2012). Several studies have reported that anterior cingulate cortex, also in humans, is playing a role in decision making (Rushworth et al., 2004; Walton, Devlin and Rushworth, 2004; Tervo et al., 2014). It was shown that posterior cingulate cortex is activated in humans during mental travels to the past and to the future (Viard et al., 2011), visuospatial imagery (Whittingstall et al., 2014) and during mental imagery of complex sequential limb movement (Sauvage et al., 2015). If such imagery is evident in the posterior cingulate cortex in animals other than humans is not known. It was stated recently that neurons of the posterior cingulate cortex (the retrosplenial cortex) play a key role in a range of cognitive functions, including episodic memory, navigation, imagination and planning for the future (Vann et al., 2009). Posterior cingulate cortex of rabbits has homologies to the ones in rodents and humans (Vogt, 2016). It was shown that task-related neurons have different types of specializations – more specific (related to concrete acts) or less specific (related to broad categories of behavioral acts and, in general, less differentiated experience) (e.g., Svarnik et al., 2005; Alexandrov et al., 2018).

The present study was aimed to figure out if mental rehearsal might be found in rabbits and if differently specialized neurons, including neurons specialized in relation to overt motor behavior, play different roles in such embodied mental rehearsal. We registered neuronal activity in rabbit posterior cingulate cortex during delay periods that did not require an animal to remember previous information and found that in these cases task-related neuronal replays were still evident, moreover replays consisted of neurons with different degree of task-selectivity.

Materials and Methods

Animals

Recordings were performed in 6 adult male rabbits (*Oryctolagus cuniculus*; weight about 3 kg). Food was continually available in the home cage except for the days of recordings. Their loss of weight did not exceed 15% from the weight of non-deprived animals of the same age. All surgical and experimental protocols were performed in accordance with National Institutes of Health guide for the care and use of Laboratory animals (NIH Publications No. 8023, revised 1978).

Behavioral paradigm

All rabbits were taught to obtain food following pedal-press in the experimental chamber with two pedals and two feeders (described in details in Alexandrov, Grinchenko and Jarvilehto, 1990). Pedal pressing activated an automatic feeder on the same side of the chamber, a pedal and a feeder were in adjacent corners. Each rabbit was to perform consecutive pedal-press task trials: pressing the pedal, turning to the feeder and taking food from the feeder at both sides of the cage. Each one side block consisted of 10-20 trials. No cue indicated the switch between the blocks. The two pedals were never active simultaneously. Infrared sensors placed inside the experimental cage monitored the position of the animal in the cage and the onset and offset of the behavioral acts.

Delay period

Following completion of pedal press shaping the delay period trials were introduced. Periodically both pedals were manually covered by a nontransparent shutter while an animal was in the middle of the experimental chamber facing the shutter. Then one of two pedals was taken out of the chamber. The flash (50 μ sec long, 0,3 Joule) indicated the beginning of the shutter opening; the full opening took less than 250 msec. Thus, the delay period lasted no longer than 250 msec. The decision-making process could be started before the shutter was fully opened.

Electrophysiological recordings

After the task acquisition, rabbits were implanted with microelectrodes. For all surgical procedures, which were performed under aseptic conditions, the animals were initially anesthetized with novocaine (8-

12 ml) injected subcutaneously. Craniotomies were made over posterior cingulate cortex and a custom-made recording chamber was fixed to the skull. The chamber was 3 mm in diameter and was attached to the skull by a ring of bone cement anchored by 3 screws evenly distributed around the craniotomy. Electrophysiological and behavioral recording techniques, as well as the criteria for the classification of the behavioral specialization of the units have been described in details elsewhere (e.g. [Svarnik et al., 2005](#); [Alexandrov et al., 2018](#)).

Unit activity was recorded from the posterior part of Area 30 Complex (pA30C) and p29b-29e of the cingulate cortex ($P=11.1 \pm 0.3$; $L=3.3 \pm 0.1$, according to [Vogt, 2016](#)). Glass microelectrodes with 2.5 m KCl, tips of 1-3 μm diameter and impedance of 1-5 $\text{M}\Omega$ at 1.5 kHz were used and driven by a custom-made micromanipulator. During the recording of the activity of each neuron, a rabbit performed alternating (left or right side of the experimental chamber) series of instrumental behavioral acts as well as acts with a delay period before the pedals were visible behind the shutter.

We recorded single-unit activity along with electromyogram (*m. masseter pars profundus*) and the timeline of behavioral events (details in [Alexandrov, Grichenko and Jarvilehto, 1990](#)). The rabbit's behavior was also video-recorded with the unit activity (audio-channel), the light indicators of the pedal pressing and head lowering, the counters of the cumulative number of spikes, and of time. As the animals' training (or behavioral shaping) consisted of several consecutive stages on each side of the experimental chamber (food intake from the feeder, turning head and body from the feeder, turning to the pedal, pressing the pedal, turning to the feeder), the results of these training stages were later used to divide behavior into behavioral elements with corresponding markers recorded in all sessions.

Data analysis

Each behavioral cycle on the left side of the cage was divided in accordance with the behavioral marks into five stages (behavioral acts): (1) turning a head toward a pedal; (2) approaching a pedal; (3) pressing a pedal; (4) approaching a feeder and (5) seizing food. Behavior on the right side of the cage was divided into analogous stages (acts 6-10; see Fig. 1). The following indices were selected as the characteristics of the activity of the neuron: the average frequency of spike activity in a particular act and the probability of an activation in the act. The average frequency of activity for the entire recording was calculated for each neuron. The exceeding by the frequency of the activity in one or several acts of the average frequency of the activity of a neuron over the whole period of its recording (or during the period preceding the flash) by not less than a factor of 1.5 was taken as activation (details see in [Gorkin and Shevchenko, 1991](#)).

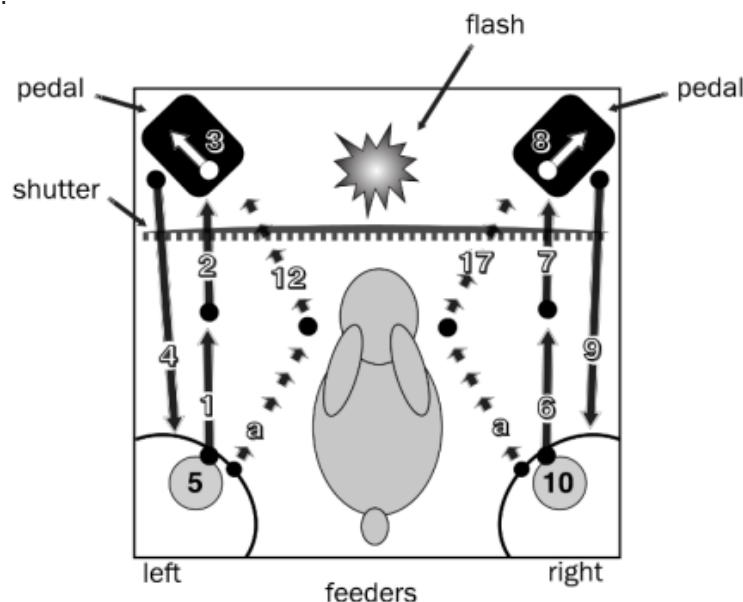


Figure 1. The experimental cage and all studied behavioral acts: 1 - turning a head from the left feeder to the left pedal; 2 - approaching the left pedal; 3 - pressing the left pedal; 4 - approaching the left feeder, 5 - food intake from the left feeder, 6 - turning a head from the right feeder to the right pedal; 7 - approaching the right pedal; 8 - pressing the right pedal; 9 - approaching the right feeder, 10 - food intake from the right feeder, a – the delay period, 12 - approaching the left pedal after the delay period, 17 - approaching the right pedal after the delay period.

In our previous studies, different types of neuronal specializations were identified in various brain areas of freely moving rabbits and rats that were performing instrumental food-acquisition behavior in an operant cage equipped with two pedals and two feeders (e.g. [Alexandrov et al., 2018](#)). Neurons could be classified in two main categories. “Narrow selective” (NS) neurons which are activated in relation to narrow range of behavioral acts of the task (i.e. approaching the feeder, taking food from the feeder, approaching the pedal and/or pressing the pedal). These behavioral acts are formed during an animal's training in the operant chamber. Their changes in activity are selectively related to a certain behavioral act, but is independent of its detailed motor execution. A neuron was considered to be specialized relative to a system of specific behavioral act if the activation in this act was observed in all cases (100% of performances of a certain act). The other category – “broadly selective” (BS) neurons. These neurons are less selective in relation to behavioral acts of the task. Their activation might be related to a certain movement (e.g. turning left or right independent of the goal of action). They are activated during an identical movement that can be performed in different behavioral contexts. Neurons that showed activation in relation to a particular movement of the body, head or lower jaw were considered to be specialized relative to the systems formed earlier in ontogeny (see in [Shvyrkov, 1986](#), [Alexandrov et al., 2000](#)). Neurons that cannot be identified as neurons of one or the other category were named “undefined” or “unidentified”, they did not show consistent activation during the given task, i.e. their specializations were unknown.

Results

A total of 356 single-unit extracellular recordings were obtained (not fewer than 50 neurons from each rabbit). From the complete sample, a total of 176 recorded in the cingulate cortex were used in the statistical analysis. The rest of the sample was eliminated because of failure to meet the inclusion criterion (i.e., stable recording during not fewer than five behavioral cycles on both sides of the experimental chamber in a control situation, and when a delay period was introduced). Approximately half of the analyzed neurons (89 neurons) had their activity specifically related to the acquired task (task-related neurons). A representative task-related neuron is on Fig. 2. The other neurons were classified as unidentified in relation to the task.

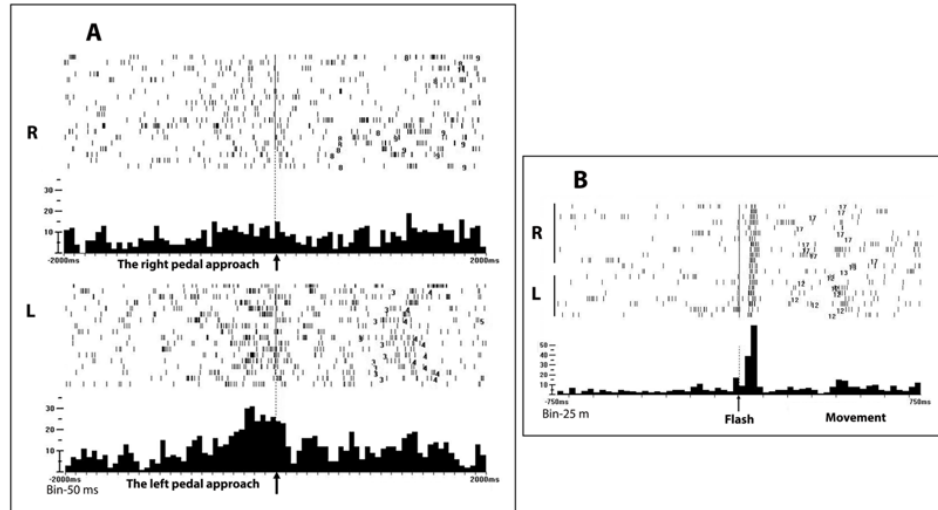


Figure 2. Activity of a representative task-related neuron specialized in relation to the left pedal approach during the instrumental behavior on both sides (A) and during the delay period (B).

Various types of neuronal activity were noticed among unidentified neurons. Neurons of one group (39%) had rare impulse activity throughout behavioral cycles (3-8 action potentials per cycle or fewer), which however unpredictably increased in some situations. Another group of neurons (23%) had evenly distributed rate of activity during behavioral cycles. Other neurons (33%) demonstrated sporadic activity, not related to behavioral acts.

Among unidentified neurons only 2.3 % (2 neurons) of cells changed their activity rate during the delay period. Both of these neurons were belonging to the group with sporadic activity, and in both of these cases activity was inhibited during the delay period.

In contrast, out of the task-related neurons 29 cells (32.6%) significantly changed their rate of

activity during the delay period. Out of them 19 neurons increased their firing rate. Among the other ten task-related cells with inhibition during the delay period were both narrow-selective neurons and broadly selective neurons (see Methods for details) in almost equal proportions. We could not find any special peculiarities in these delay-related inhibition neurons as compared to neurons with delay-related activation.

Task-related neurons we further classified into two categories: (1) NS-neurons and (2) BS-neurons (see Methods for details). The numbers of NS-neurons and BS-neurons were approximately the same: 43 and 46, respectively.

Eleven cells (26%) among NS-neurons and 11 cells (24%) among BS-neurons activated during the delay period. The mean latency of activation (maximal frequency was taken as a point of activation) after the flash during the delay period was different for NS-neurons and BS-neurons: 151.8 ± 27.6 ms for NS-neurons and 249.5 ± 31.9 ms for BS-neurons (Mann-Whitney, $p < 0.05$). As compared to NS-neurons (out of which nearly a quarter had short-latent activations) none of BS-neurons had short latency of activation – earlier than 100 ms after the flash (Fig. 3).

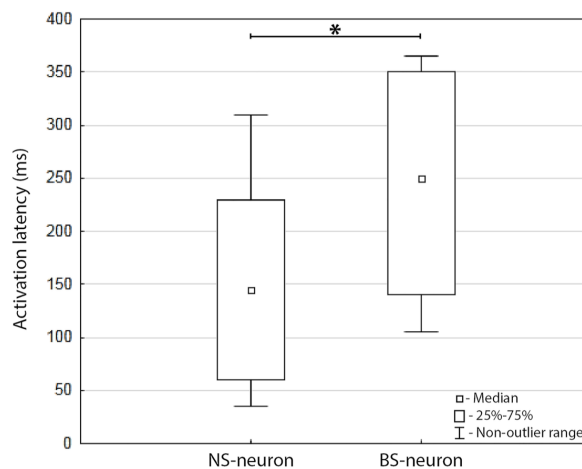


Figure 3. Neuronal activation latencies after the flash. NS – narrow selective neurons, BS – broadly selective neurons.

In addition to the acts where NS-neurons showed selective and stable activations it was noticed that NS-neurons could be activated during some behavioral acts that were not specific for them. For example, a neuron, activated during pedal-pressing, had to be activated in all acts of pedal pressing in order to be classified as narrow selective (NS-neuron) in relation to pedal-pressing. But the same “pedal” neuron could increase its firing rate during, for example, in some of the cases, feeder approaching. We counted such non-specific activations (to be counted they had to appear in at least 40% of the same acts, see details in Alexandrov et al., 2018; Sozinov, Bakhchinaa and Alexandrov, 2021) for every task-related neuron. We found that the number of non-specific activations was significantly higher for those task-related neurons that belonged to NS-neurons activated during the delay period (mean – 2.9 acts) as compared to NS-neurons that didn’t activated during the delay period (1.53 acts) or BS-neurons (2 and 1.92 acts, respectively activated and non-activated during delay periods) (Mann-Whitney, $p < 0.05$).

Discussions

In the present study we, as many others, demonstrated that animals “doing nothing” (no overt behavior present) still have their brains “full of meaning”, and that the so-called “background” activity is not “noise”, but is related to the organization of behavior (Vaadia et al., 1995; Arieli et al., 1996; Contreras et al., 2013; Kim et al., 2019). It might be suggested that spontaneous activity in the brain is its regular activity, and that ongoing spontaneous activity is modified by new experience formation (Wilson and McNaughton, 1994). The nature of such spontaneous activity is often described as elusive, but it might reflect recent experience. The brain is considered not as a passive input–output system, but as an active, projective “device” that spontaneously generates “hypotheses” and tests their adequacy (e.g. Shvyrkov, 1986; Buzsaki, 2019). It has been shown that animals’ interactions with environment enhances

similarities between spontaneous and environment-related neural activity (Berkes et al., 2011). Repeated stimulations, even in urethane-anesthetized rats, produced reoccurring of evoked unique sequential patterns of neural firing in corresponding cortices, moreover such reoccurrence requires desynchronization during stimulations (Contreras et al., 2013). Diversity of spontaneous activity patterns is generated by prefrontal cortical neurons (Dehaene and Changeux, 1997). In the present study, approximately one-third of recorded task-related neurons was activated during the delay period. The neurons whose selectivity could not be identified as related to the task did not show activations during this period. All together it implies that so called spontaneous activity should be associated with ongoing actualization of individual experience. This future-directed actualization is in line with the contemporary ideas of the proactive brain (Bar, 2009) or predictive brain (Buzsaki, 2019) or brain readiness for the future (Schurger, Pak and Roskies et al., 2021), which, in its order, can be traced back to the ideas of expected results (Anokhin, 1974) or even further (more details on the subject might be found in (Alexandrov, 2022)).

Delay periods are characterized by not only activations of narrow selective task-related neurons, but also activations of broadly selective neurons which might be related to classical "motor programs". Such results indicate that the same neurons, independent of selectivity degree, are involved in overt and covered phase of experience actualization, which might imply that decision making is embodied cognitive process. Recent data suggest that real actions and action imaging share some of the same neural substrate, which implies that conceptual knowledge is mapped within the "sensory-motor" systems or embodied in the way the organism interacts with the environment (Gallese and Lakoff, 2005). We found here that during the delay period some task-related neurons showed inhibition of activity. Thus, it can be assumed that there are at least two similarities between the compared overt and imaginary actions. The first one is the existing overlap between the sets of activated neurons in these two types of actions. The second congeniality is that they share similar characteristics of neuronal organization, which consists of opponent relationships: an activation of some neurons corresponded to an inhibition of others can be seen in both overt and covert behaviors.

Previous studies suggested that during delay periods neuronal activity is temporally organized (MacDonald et al., 2013), though it might look unclear, why some neurons fire earlier than others. We showed that task-related neurons activated in a certain order during the delay period: narrow selective neurons activated preferentially earlier as compared to neurons with less selective specializations. It was earlier shown that some neurons of motor cortex and in prefrontal cortex were modulated early in the delay period while other neurons of the same areas were modulated in a persistent manner over the duration of the delay period, moreover delay-related modulations started earlier in motor cortex than in the prefrontal cortex (Narayanan and Laubach, 2009). It was also shown (Thura and Cisek, 2014) that approximately 280 ms before movement onset, premotor cortical activity tuned to the selected target reached a consistent peak while motor cortex activity tuned to the unselected target was suppressed, which might reflect the resolution of a competition between the potential behavioral acts during decision making. In this work we showed that narrow selective neurons fire before broadly selective neurons during delay periods. If we considered developmental history of these neurons, we could infer that broadly selective neurons acquire their specializations earlier in ontogenesis as compared to narrow selective neurons. Thus, less selective neurons are active simultaneously with different sets of neurons, these neurons are shared portions of many neuronal groups. During mental rehearsal activity of the more selective neurons «drives» activation of less selective neurons. It was shown earlier that broadly selective neurons have different activity patterns dependent on the neuronal set they are in accordance (see details in Alexandrov et al., 2000, Alexandrov et al., 2018). Thus, less selective neurons are active simultaneously with different sets of neurons, these neurons are shared portions of many neuronal groups. During mental rehearsal activity of the more selective neurons «drives» activation of less selective neurons. It was shown earlier that broadly selective neurons have different activity patterns dependent on the neuronal set they are in accordance (details see in e.g. Alexandrov, 2008). It might be suggested that in order to fulfill this accordance narrow selective neurons appear to have more cases of non-specific activity (which implies more functional connections) as we showed in this work. We also found that neurons with the higher number of functional connections fire earlier than others. This finding might be related to the idea of "hub" neurons (e.g., Cossart, 2014), which have more functional connections and might have a higher number of spontaneous firings.

Conclusions

Our theoretical framework suggest that neurons are specialized in relation to not the function of decision making, perception or motor programs but the systemic functions, i.e., functional systems formed for reaching different adaptive individual results in the environment (see, e.g., Anokhin, 1974; Alexandrov, 2008, 2022; Alexandrov et al., 2018). Hence memory content that may be used at any stage of behavior preparation, is memory about all behavioral acts formed during individual history. Systemically specialized neurons underly these memories. Memory actualization is, in turn, activations of those neurons. The results described in this article showed that mental rehearsal during delay periods demonstrated features of embodiment – activity of the same neurons that are used during overt movements. Moreover, this neuronal activity is temporally organized in a specific way which might be considered as mechanisms of embodiment. Neuronal activity sequence during the delay period, used for decision making, depends on the role of neuron in overt behavior. In summary, we found a specific pattern of neuronal activity during delay period related to embodied decision making.

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Conflict of interests

The authors declare no conflict of interest.

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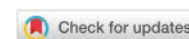
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Is the Integrative Teaching Approach Beneficial for Learning?

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Abstract: Environmental protection contents are characterized by a wide range of interdisciplinarity. They are realized separately within the teaching of biology and geography (5th–8th grade) in elementary school in Serbia. Numerous concepts and facts are similar, especially within the content Nature Protection. The application of an integrative teaching approach in the realization of environmental protection contents in elementary schools was investigated. Pedagogical experiment with parallel groups of elementary school students was conducted by applying integrative teaching approach in the experimental (E) and traditional approach in control (C) groups of students. The data were obtained through the pre-test and post-test. Integrative teaching approach has proven to be effective in the realization of the above-mentioned program contents.

Keywords: integrative teaching approach, elementary school students, environmental protection contents.

Introduction

The curriculum is organized through isolated subjects, which is a big problem in education, because it prevents students from recognizing and creating connections between subjects (Frykholm and Glasson, 2005; Owen, 2015). Integrated learning provides students with the opportunity to see the interconnectedness and interrelationships between the different parts of curriculum. Away from focusing on learning in particular curriculum areas, an integrated program is based on skill development around a topic that is relevant to the students. Godemann (2006) outlines the path that knowledge needs to change in order to be applicable in an integrative approach. According to Godemann (2006), disciplinary knowledge is simplicity, singularity, linearity and it can cause fragmentation in knowledge and boundary formation. On the other hand, integrative knowledge is characterized by heterogeneity, complexity, non-linearity, connection, collaboration, and consequence.

All school subjects and contents that are more complex and abstract have to use an appropriate teaching approach (Gagić et al, 2019). Children learn better when valid connections are laid out across the entire curriculum. Integrative teaching promotes meaningful learning especially in the initial stages of education, but integration is possible in any of the stages of learning (primary, secondary, and tertiary) (Kaur, 2019). According to Acarli (2020), integrating parts of knowledge from different areas is very important for critical and creative skills of students.

Integrative learning can be defined as the process of making connections between skills and knowledge from teaching sources and experiences. It connects theory and practice, and uses different perspectives to help students understand issues (Lewis, 2017; Huber et al., 2007). Integrative learning suggests that student connect previous knowledge with the newly acquired and see connections in the curriculum (Brownlee and Schneider, 1991; Klein, 2005; Leonard, 2012).

According to Haapaniemi et al (2019) “an essential skill in the twenty-first century is how to make sense of the complex flood of information”. For this reason, it is important for students to develop the ability to connect scattered information. The authors call these students integrative thinkers (Haapaniemi

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et al, 2019).

From the above definitions of integrative learning, it is concluded that this model of learning is the connection of scattered information, as well as the connection of previous knowledge with new. However, integrative learning is much more than connecting scattered information. The term “integration” means the unification of certain parts into one whole and the interconnection of autonomous elements. Teaching, based on this approach, can be very stimulating for students. Content that is interconnected contributes to knowledge that is complete, valuable and usable. An integrative approach implies an active student as well as a teacher. It is not just about conveying facts, but much more about solving problems, asking questions and actively seeking answers from your environment.

Integrative learning represents a challenge for general education programs (Mahoney and Schamber, 2011). The Association of American Colleges & Universities (2007) highlights integrative learning as one of the important teaching approaches in modern university education. Therefore, it is important that students at colleges acquire knowledge in the field of integrative learning. This could be achieved through a curriculum that encourages integrative learning, as well as through various trainings and seminars (Huber and Hutchings, 2004).

Through integrative teaching and learning, students can develop a deeper understanding of content and to improve understanding of a complex problem (Leonard, 2012; Becker and Park, 2011).

This approach can help students in the synthesis and integration of knowledge. In that way, they could acquire the ability to solve problems with an ethical dimension. Also, it could encourage their critical, creative, and unconventional thinking (Ivanitskaya et al., 2002).

Integrative teaching approach allows students to train effectively by solving problems from different fields and to gain a deeper and more systematic knowledge that can be applied to real life. This approach prepares students for the process of lifelong learning as it blurs the traditional boundaries between subjects (Lake, 1994). Integrative learning has proved to be one of the key strategies for students' success. In particular, integrative learning prepares them to respond to complex problems based on interdisciplinary connections, experiential knowledge, and co-curricular learning (Rossing and Lavitt, 2016). According to Miller (2005), “integrative learning refers to many different integrative capacities: the application of theory to practice, the ability to connect skills and knowledge from one course to solve and explore issues in another, and the capacity to reflect and identify connections made over time”.

Integrative teaching uses interdisciplinary approaches and it is focused on applying real-world scenarios. It also has a positive effect on the development of the student community (Abraham and Shih, 2015).

Tani, Juuti and Kairavuori (2013) point out that “different disciplines have different ways of ‘looking’ at the world and constructing people’s understanding of the world, and therefore it is important to understand the perspectives they use”. An integrative teaching approach is a very good solution for numerous scientific contents in subjects such as: biology, chemistry, physics, geography, mathematics (Johnson and Dasgupta, 2005). In the science subjects, numerous links can be found in content dealing with the problem of environmental protection (Abdullah, Halim and Shahali, 2011). According to Clark and Linn (2010), “knowledge integration involves a dynamic process of linking, connecting, distinguishing, organizing, and structuring ideas about scientific phenomena. These ideas include facts, patterns, templates, views, theories, models, and visualizations.”

Environmental protection is one of the main topics in modern world. Because of that, environmental education occupies an important place in the curriculum. The teachers training has a significant role in the ecological education system and including environmental protection topics in school lessons are very important (Mróz, Ocetkiewicz and Walotek-Sciańska, 2018). Geography and biology are very important subjects that ensure the realization of environmental competencies (Mwendwa, 2017). There is a great potential for achieving an integrative approach between geography and biology, because it is possible to connect a large number of topics (Tani, Juuti and Kairavuori, 2013). Education for a sustainable future is a huge challenge for educational systems. Some authors (Hua, 2004; Kimaryo, 2011) agree that environmental education should go beyond the education in a classroom and into society, everyday life, and nature. Using active teaching methods and connecting theory and practice with examples from real life situations provide an opportunity for students to learn better. According to Moon (2008), using active teaching methods encourages students to think critically and encourages them to learn, which is very important in the field of environmental education.

Elementary programme contents related to environmental protection are taught separately within two teaching subjects (biology and geography) in Serbian elementary schools. The most similarities in the topics related to environmental protection between these two subjects are in the eighth grade. In biology classes, eighth-grade students learn about the ways the environment is threatened, types of erosion, the

effects of climate change, natural and cultural assets, and similar issues, while in geography classes, students are taught the national geography of their country.

The topics that exist in both biological and geographical contents and which contain the most of the same (common) concepts are National parks of the Republic of Serbia (Geography) and Categories of protected natural assets (Biology) (Figure 1). They are very suitable to be realized and combined with the integrative teaching approach.

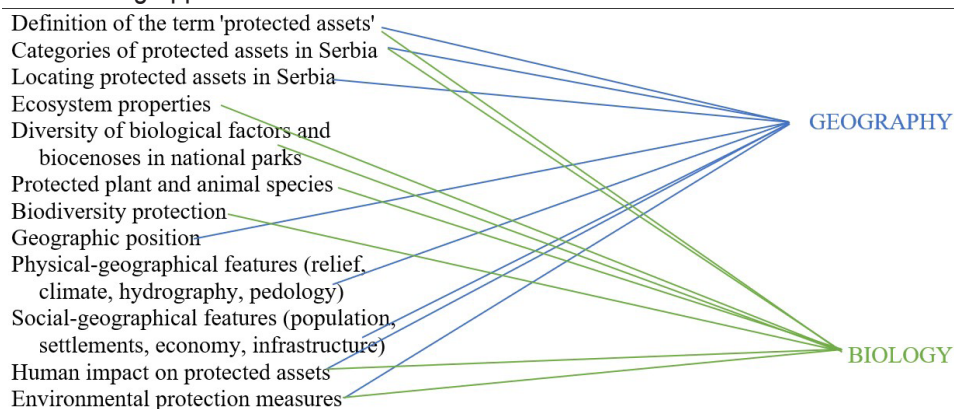


Figure 1. Geography and biology topics and concept

Based on the above, the application of the integrative teaching approach was started concerning these program contents in the eighth grade of elementary school. The main goal was to discover whether this type of teaching is helpful, in terms of obtaining knowledge and its retention. The intention was to answer the following research questions:

Does the application of integrative teaching approach contribute to a quantity of the obtained knowledge?

Does the application of this approach contribute to knowledge retention?

It was expected that there would be a difference in the quantity of the acquired knowledge and knowledge retention between the students (in favor of the students who had integrative teaching). The goal was to identify and measure this difference.

Materials and Methods

The pedagogical experiment with parallel groups [experimental (E) and control (C)] was applied (Killermann, 1998) in order to investigate if the integrative teaching approach is beneficial for learning.

The data was gathered through the pre-test, post-test, and re-test to determine whether the integrative approach (experimental factor) is effective as a teaching approach for presenting the concepts of topics *National parks of the Republic of Serbia* (Geography) and *Categories of protected natural assets* (Biology).

In Group E, the lessons were done through an integrative teaching approach, and in Group C a traditional approach (in both subjects, separately) was used. The research was conducted at the elementary schools in Novi Sad.

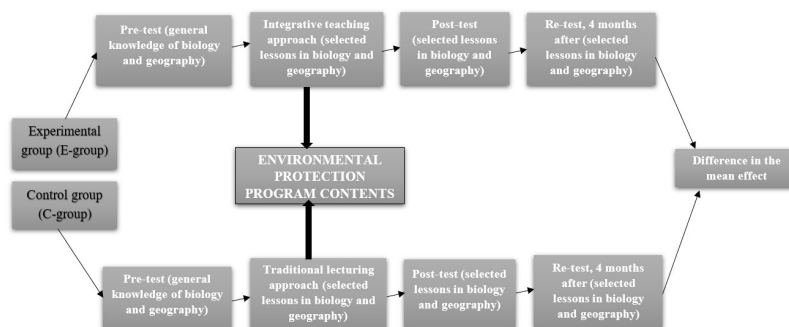


Figure 2. Research organization

The research included a total of 135 eighth-grade students (fourteen years old) from the elementary schools from Novi Sad, Serbia. The students were grouped into Group E (N= 68) and Group C (N=67).

Before the introduction of the experimental factor (integrative teaching approach) in the experimental group, the groups were made uniform concerning general knowledge of geography and biology, as determined by the results of a pre-test of knowledge.

All the participants, including students' parents, gave the permission for research which was in a way that agrees with the permission of the ethics committee of the Faculty of Sciences.

The pre-test included fourteen tasks in total, classified into three broad categories of the cognitive domain: Rank 1 (remembering and understanding), Rank 2 (applying and analyzing), and Rank 3 (evaluating and creating). In order to determine difficulty levels of knowledge, the tasks were divided based on the adopted Bloom's taxonomy ([Anderson and Krathwohl, 2001](#)), where the cognitive domain is divided into six categories (remembering, understanding, applying, analyzing, evaluating, and creating). The test is based on all program contents that precede the lessons about *National parks* and *Categories of protected natural assets*.

After making the experimental group (E) and the control group (C) equal, Group E was taught both geography and biology contents by applying an integrative teaching approach, and in Group C a traditional approach was used.

There were one geography and one biology teacher, who realized integrative teaching for the E group. After short teachers' instructions, educational integrative materials were distributed to each student. This integrative material, in the form of a worksheet, consisted of four questions that they had to answer, map of Serbia and images of Serbian national parks, protected plant and animal species (Appendix 1). Students had to choose the appropriate images for each Serbian national park and to put them on the map of Serbia. In doing so, they were able to use textbooks and other available teaching resources.

After working with integrative teaching material, they all discussed correct answers and repeated the presented common concepts on the map, for each Serbian national park, with the help of teachers.

In the development of integrative teaching materials for elementary school students, the cooperation team in this research included biology and geography teachers from this elementary school, as well as university teachers from the departments of teacher education for these teaching subjects (the University of Novi Sad and the University of Belgrade).

The control group of students was taught by the traditional approach. The students watched and listened to the consecutive Powerpoint presentations, which were presented by biology and geography teachers. The first presentation contained only biological and the second only geographical teaching content. There was no students' discussion after these presentations, nor an opportunity for their independent work and reasoning.

Groups E and C were independent, in separate classrooms. Students from Group E had no practice about the integrative teaching ([Kember, 2003](#)). After that, a post-test was distributed to evaluate the knowledge acquired by the students who used the integrative teaching approach and by those exposed to the traditional teaching approach. The post-test was divided into three ranks/categories, as it was the case in the pre-test (Figure 3). The tasks in the test were of different types and ranked by difficulty. The test was performed by students of both groups (experimental and control), and the results were later analyzed.

<p>Rank 1</p> <p>Circle the letter of the correct answer:</p> <p>The largest National Park in Serbia is:</p> <ol style="list-style-type: none"> 1. Tara 2. Kopaonik 3. Fruška Gora 4. Đerdap <p>The river that flows through Tara National Park is:</p> <ol style="list-style-type: none"> 1. Dunav 2. Drina 3. Ibar 4. Sava 	
<p>Rank 2</p> <p>Write the appropriate number on the line next to each term, depending on which National Park the term is related to. Enter number:</p> <p>1 for Fruška gora, 2 for Đerdap, for Tara, 4 for Kopaonik and 5 for Šar Planina</p> <p>Golubac fortress _____</p> <p>Glacial lakes _____</p> <p>Salamander _____</p> <p>Picea omorika _____</p> <p>Brown bear _____</p>	
<p>Rank 3</p> <p>In the appropriate fields, enter the name of biomes characteristic of the specific latitude in which they spread.</p> <div style="text-align: center;"> </div>	

Figure 3. Example of some tasks used as an Indicator of Ranks 1, 2 and 3 (post-test).

Four months later, a post-test was distributed (re-test) to compare the knowledge retention in E and C groups of students. The tasks in the re-test were of different types and ranked by difficulty. The re-test, was also performed by students of both groups (experimental and control), and the results were later analyzed.

The data were analysed by the following statistical procedures (sum, percentage frequency, mean, standard deviation, and Student's t-test for testing any differences between Groups E and C). The software package SPSS 23 was used for statistical analyses (Sheridan, 2012).

Results and Discussion

The results of the pre-test are showed in Tables 1 and 2. The standard statistical indicators (mean of the number of achieved points-M and standard deviation-SD) are given in Table 1. It shows the students' achievement on the pre-test expressed in the above-mentioned terms, in all three ranks of tasks, as well as in the test as a whole. The E group students achieved 63.29% points and the C group students 57.48% points (in total).

Table 1.
Basic statistical data for the pre-test.

Group	Rank 1			Rank 2			Rank 3			Total		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
E	68	20.62	4.48	68	23.88	7.87	68	19.03	9.80	68	63.29	19.58
C	67	19.52	5.95	67	21.28	9.71	67	17.09	10.26	67	57.48	23.56

Note: N – number of students, M – mean of the number of achieved points, SD – standard deviation

Table 2 shows relations between Groups E and C, according to t-value (for pre-test).

Table 2.
Testing group uniformity in the pre-test, using an independent two-sample t-test.

Group	Rank 1		Rank 2		Rank 3		Total	
	<i>t-value</i>	<i>p-value</i>	<i>t-value</i>	<i>p-value</i>	<i>t-value</i>	<i>p-value</i>	<i>t-value</i>	<i>p-value</i>
E : C	2.114	.036	1.641	.103	.742	.460	.607	.545

Based on the given results for the pre-test for Groups C and E, it can be noticed that only in Rank 1 exists slightly statistically significant difference (Rank 1: $p = .036$). Groups E and C were equalized in terms of students' general knowledge of geography and biology before involving the experimental factor (correlating concepts from geography and biology).

Table 3 shows the students' achievement on the post-test expressed in the above-mentioned statistical indicators (M and SD), in all the three ranks of tasks, as well as in the test as a whole. The E group students achieved 72.33% points and the C group students 63.16% points (in total).

Table 3.
Basic statistical data for the post-test.

Group	Rank 1			Rank 2			Rank 3			Total		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
E	67	24.31	4.34	67	24.75	8.44	67	23.27	8.38	67	72.33	18.29
C	62	20.69	6.36	62	20.98	10.57	62	21.44	11.35	62	63.16	26.40

Note: N – number of students, M – mean of the number of achieved points, SD – standard deviation

Table 4 shows relations between Groups C and E, according to t-value (for post-test).

Table 4.
Testing group uniformity in terms of the post-test, using a t-test.

Group	Rank 1		Rank 2		Rank 3		Total	
	<i>t-value</i>	<i>p-value</i>	<i>t-value</i>	<i>p-value</i>	<i>t-value</i>	<i>p-value</i>	<i>t-value</i>	<i>p-value</i>
E : C	3.617	.000	2.347	.020	3.310	.001	4.003	.000

By comparing the average values of the results achieved (Table 4), a clear difference can be observed between Groups E and C in terms of the individual ranks and in the test as a whole, favoring the former. On the basis of the results presented for the post-test of knowledge for Groups C and E, it can be noticed that there are statistically significant differences in the number of points achieved in all the three levels of tasks and in the test as a whole, in favor of Group E.

The results of the re-test are presented in Tables 5 and 6 and show the students' achievement in the post-test expressed in above mentioned statistical indicators (*M* and *SD*), in all the three ranks of tasks, as well as in the test as a whole. The E group students achieved 56.5% points and the C group students 45.3% points (in total).

Table 5.
Basic statistical data for the re-test.

Group	Rank 1			Rank 2			Rank 3			Total		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
E	68	19.37	5.49	68	20.81	10.15	68	16.32	8.86	68	56.50	21.98
C	60	16.10	5.94	60	15.70	10.97	60	13.50	10.89	60	45.30	25.43

Note: N – number of students, M – mean of the number of achieved points, SD – standard deviation

Table 6 shows relations between Groups C and E, according to t-value (for re-test).

Table 6.
Testing group uniformity in terms of the re-test, using a t-test.

Group	Rank 1		Rank 2		Rank 3		Total	
	<i>t</i> -value	<i>p</i> -value	<i>t</i> -value	<i>p</i> -value	<i>t</i> -value	<i>p</i> -value	<i>t</i> -value	<i>p</i> -value
E : C	1.253	.213	.899	.370	2.253	.026	1.244	.216

On the basis of the results presented for the re-test of knowledge for Groups C and E, it can be noticed that there are statistically significant differences in the number of points achieved in Rank 3, in favor of Group E.

The results of the final test show that the experimental group, achieved better results than the control group, and the students from experimental group showed a significantly higher quantity of knowledge acquired. This was proven in all the Ranks (Rank 1-remembering and understanding, Rank 2-applying and analyzing, Rank 3-evaluating, and creating), where the values were outstanding compared to the Rank of the control group.

The application of integrative teaching approach in the realization of geography and biology curricula in primary schools (in Serbia) proved to be very effective for acquiring knowledge.

There were many studies related to this topic. The study, which analyzed the effects of applying an integrative approach (mathematics and science instruction) on the achievements of third-grade students (applied on two groups: experimental school and control school), presented evidence that such an approach was beneficial (Adamson et al, 2011).

The researchers found that the integrative approaches among science, technology, engineering, and mathematics (STEM) subjects make significant progress in learning. According to Becker and Park 2011, elementary school students showed better results through integrative teaching. Berlin and White research program emphasizes the importance of teaching science and mathematics as integrated curricula, especially when understanding abstract mathematical concepts (Freitas and Bentley, 2012).

It was evident that an integrative approach had a positive effect on knowledge, skills, and attitudes across subject areas and develop a more powerful understanding and connectivity of key ideas (Kadji-Beltran, 2002). In the integrative learning research, through simulation and problem-based learning (Walshe et al., 2013) the results indicate performance improvement in all research domains of competency while the integrative approach showed a stimulating effect on students' further learning.

By analyzing student essays, it was determined that the integration of geography with physics and visual arts had positive effects on the learning and the attitudes of students and teachers (Tani, Juuti and Kairavuori, 2013). Authors point out „the students experienced integration as an interesting and fruitful way of working as future teachers“.

The results of the assessment project indicate that interdisciplinary learning and teaching is effective in promoting knowledge retention, development of general education skills, and high levels of students' engagement (Carmichael and LaPierre, 2014).

The results presented in this research (primary schools in Novi Sad), showed that the retention of knowledge is higher in the experimental group, where the integrated approach was applied. Compared to that, it was evidenced by a correlation between knowledge retention and interpretation activities on the ability to integrate knowledge (Marsh and Stock, 2006). Also, the integrated education plays an important role in environmental education and training and has importance for understanding the problems of the environment. Topics related to environmental protection are treated only superficially in the science curriculum. It is necessary to make changes in the curriculum and adapt it to current environmental problems (Abdullah, Halim and Shahali, 2011).

Most of the students think that ways of teaching integrative content are quite important and very helpful for learning geographical and biological content. According to Milanković Jovanov et al. (2019), the overall students' attitudes were positive about the class with integrative teaching model. The students agreed that they were much more engaged than in regular classes and there was a good atmosphere during the class.

The organization and preparation of the presented research indicated that teachers, who have been involved in this research did not have enough support in the curricula in terms of providing cross-curricular topics and integrative organization of teaching (Milankovic Jovanov et al., 2019). One of the main problems is that class programs are not arranged according to the integrative approach to teaching. It is very difficult to achieve outcomes and reach standards according to subject programs that do not match. In countries that have an organized curriculum based on classical subjects that are divided, it is very important to plan team and integrative teaching.

Teachers pointed out that the main obstacles to organizing such classes were that they were not sufficiently prepared during their education. Also, one of the main problems is that new teaching models can cause students' aversion. This is evidenced by the different responses of students in a school that organizes integrative teaching compared to students who have never worked under this teaching model (Milankovic Jovanov et al., 2019).

The positive results of implementing the integrative approach not only relate to progress in different aspects of student development, but it also has a beneficial effect on teachers as well. It provides them with a more dynamic organization of their time and a modern method of teaching because they can use numerous sources in teaching. Integrative teaching experiences face many challenges and it is very important to train teachers during their studies to use new learning models. To achieve the best results and provide quality education, it has been proven that it is necessary to combine different forms of teaching approaches. The most effective results in education are provided by a combination of integrative teaching and interdisciplinary studies (Newell, 2010).

Conclusions

The experiment provided an answer to both research questions. It can be confirmed that the application of the integrative teaching approach has contributed to better quantity of the acquired knowledge. Also, the application of this approach contributes to knowledge retention.

Experimental group achieved better results in the post-test (and re-test) of knowledge than Control group. The high level of statistically significant difference is particularly noticeable between the groups (in favor of the experimental group) in Rank 1 and Rank 3 (remembering, evaluating, and creating).

It can be concluded that the application of the integrative teaching approach directly contributed to better learning and knowledge acquisition in teaching the content *National parks* and *Categories of protected natural assets*. The positive effects of the integrative teaching approach were especially higher in Rank 3 (evaluating and creating). Also a higher retention of knowledge was noticed in students who had integrative teaching classes.

The interconnection of contents between subjects allows teachers to present certain contents as more interesting. In that way, students' knowledge can be increased. Also, it would greatly contribute to the retention of knowledge.

The integration requires detail and creative planning and thinking and the subject integration is often a challenge for teachers (Heywood, Parker and Jolley, 2012). It challenges lecturers to reflect reality in the curriculum and it also challenges students to become active and to be prepared to research, to work independently in order to think and solve problems (Walshe et al., 2013).

To improve teaching by using an integrative teaching model, it is important to provide training for pre-service and in-service teachers, because the implementation of the integrative approach mostly depends on the teacher. Biology and geography teachers need to be trained for applying an integrative

approach. It is also necessary to provide resources for that. Curricular integration of environmental protection contents in elementary schools in Serbia is also planned to increase the efficacy of teaching. The issue of environmental protection and sustainable development is important in the modern world and therefore it is necessary to promote it in every subject in which this issue arises.

Future research in the area of integration in different teaching subjects, and take into account cognitive load, i.e., mental effort as indicator of the efficiency of the teaching approach (Radulović and Stojanović, 2019; Radulović, 2021; Županec et al., 2018). It is expected that this will encourage teachers to cooperate and thus effectively integrate similar teaching contents from different subjects.

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Conflict of interests

The authors declares no conflict of interest.


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Appendix 1.

Example of worksheet for students with integrative contents

I Circle the letter of correct answer:	
1. Protected plant species in the Tara National Park, <i>Picea omorika</i> (Pančićeve omorika) grows in the vegetation zone at a height of:	<p>a) below 500 meters</p> <p>b) from 500 to 2000 meters</p> <p>c) above 2000 meters</p>
2. What type of biome extends on the edge of the national park Fruška gora due to the humid-continental climate of the Pannonian plain?	<p>a) Steppe</p> <p>b) Tundra</p> <p>c) Savanna</p>
3. Which national park is facing the problem of cutting down trees to build ski slopes?	<p>a) National park Đerdap</p> <p>b) National park Tara</p> <p>c) National park Kopaonik</p>
4. What factor influenced the reduced fish populations in the upper Danube River in the Djerdap National Park?	<p>a) Climate change</p> <p>b) Construction of a dam on the Danube</p> <p>c) Increased traffic on the river</p>
II On the map of Serbia, arrange the material on the site of the appropriate national park	
	

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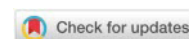
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Social Representations of Body: A Comparison in The Two Generations of Russian Women (Results of an Exploratory Study)

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Abstract: Body is a complex and polymorphic object that lies at the intersection of a number of dimensions: natural-social-cultural; individual-social; body-soul; flesh-spirit; private-public; visible-invisible; decent-indecent; real-virtual; health-illness. If the body is in the heart of psychological research, lay thinking analysis rests somewhat in the shadow of this research line. Following the ideas of the social representations theory, the aim of study was to reveal how the body was represented in groups of young and older Russian women. A total sample consisted of 314 Russian females (N=258 females formed the group of young females from 18 to 25 years old, Mage=19.73, SDage =1.56; N=56 females formed the group of older females aged from 39 to 55 years old, Mage=45.63, SDage =4.68). The snowball technique was used in order to recruit the participants, they were invited to fulfil the online questionnaire. A free-association technique was used. The data were analysed by using prototypical analysis. The obtained results shed light on the articulation of the two normative elements health-beauty in the social representations of body in the two generations of Russian women. The comparison of the hypothetical structure of social representations (my body, ideal body, female body) in the two age groups of Russian women reveals several points concerning the lay mentality as a matter of age. A further study to verify the hypothetical structure of the social representations of body in young and older Russian women is needed.

Keywords: empathy, endogenous and exogenous factors of empathy, family, education system, media, the culture of peace.

Introduction

Body is a complex and polymorphic object that lies at the intersection of a number of dimensions: natural-social-cultural; individual-social; body-soul; flesh-spirit; private-public; visible-invisible; decent-indecent; real-virtual; health-illness. An analysis of the naive representation crystallised in the Russian language leads to a conclusion that some oppositions are not absolutely parallel. For example, the body is a place of the soul. In the case of the opposition flesh-spirit, flesh does not interact with spirit, even more, flesh has negative connotations like base motives (Zaliznyak, Levontina and Shmelev, 2012).

The discourse about the body includes some other topics like taboo, sexuality, maternity, beauty, power etc. Body is an arena of social norms functioning as well as relevant social control associated with these norms. It needs to be underlined that social norms evolve over time, change from one social group to another, from one culture to another. This fact has an impact on the body image as well as on the social practices associated with the body. At all stages of human history, the human body has been subjected to social control (Kabakova and Compt, 2005). The female body is subject to a more strict control in comparison with the male one. The higher social status a woman occupies, the stronger is the social control. The emergence and widespread of feminist ideas is a quite important moment concerning the body. First of all, "feminists reinserted the body into history, bringing to light issues that had previously been considered too vulgar, trivial or risqué to merit serious scholarly attention" (Shienbenger, 2000, p.1). Then, these ideas that appeared in the public discourse affected the issue of social norms as well as influenced upon the perception of the female body.

Some particularities of the Russian context concerning the social control of the body in general are related to the Orthodox religion with its suspicion towards corporeality, and to the censorship of the Soviet

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time with its struggle against physiology (Kabakova and Compt, 2005). It seems that the body censorship has loosened somewhat since the thaw era (Lebina, 2014).

The advances in the medical technologies have opened great possibilities for individuals in order to intervene into the spheres that used to be seen as sacred. It would not be an exaggeration to say that the progress in this domain of scientific knowledge turned the fairytales (for example, about rejuvenating apples, living water, or Thumbelina) into reality. Now individuals have got a range of possibilities to correct, improve, or change themselves and their bodies in accordance with certain standards widely broadcasted by the mass media. Even a quick look at the statistical data available from the International Society of Aesthetic and Plastic Surgery (ISAPS International survey on Aesthetic/Cosmetic procedures, 2020) allows us to conclude that aesthetic and plastic surgeries are widespread around the globe, in various regions of the planet people coming from different cultures, age and gender groups want to change their bodies, following certain beauty standards, which are universally transmitted by the mass media in the era of visual culture (Rose, 2014) when the iconic entities dominate the conceptual ones. It seems possible to say that the body is seen as fragmented in terms of the possibility to change it. The most demanded procedures are the following: breast augmentation, liposuction, eyelid surgery, rhinoplasty, abdominoplasty (a certain decrease of the surgical procedures frequencies are observed from 2019 to 2020, but it could be explained by the COVID-19 pandemic) (ISAPS International survey on Aesthetic/Cosmetic procedures, 2020).

With the emergence and widespread of the new technologies (Internet is one among others), an individual has got an opportunity to acquire a virtual body. This kind of body exists according to different rules than the real one. This is one of the ways to construct a desired image of oneself, to correct imperfections of any kind, to get closer to the ideal.

By referring to analysis proposed by Kabakova and Compt, 2005, it is possible to conclude that body is among the attractive and relevant topics in social sciences and humanities. The research questions concerning the body (as a cultural object) are in the very center of scientific interest in different disciplines, namely: philosophy, history, philology, culture studies, social anthropology, sociology and psychology. Following the idea expressed by Jodelet, body is an important issue in psychology (Jodelet, 2015), this topic is at the heart of psychology. Indeed, even by taking a very quick look at the knowledge obtained from the different branches of psychological discipline, it is possible to become aware about the exactness of Jodelet's claim. The variety of questions in psychology where the body is a variable of analysis is really vast: starting from body-mind problem, passing to the psychoanalytic conceptualisation of body, formation of body as a sociocultural entity, self-consciousness, body language, eating behaviour, body objectification, going vers stress, attraction, emotions, health behaviour, stereotypes, stigmatisation, etc.

Our particular interest in this paper is related to the naive representations of body. Before focusing our analysis on the corresponding theoretical framework and pertinent empirical facts, the two general points should be stated here.

First, the connection between body and self should be revealed: it concerns the idea that the body schema ("a subjective image of the relative position and state of motion of body parts in space" (Stolin, 1983, p.212) is a part of self-consciousness. Being a mental entity, body schema can go beyond the physical borders and also includes objects like clothes or even physically absent elements. For example, in case of surgical amputations the so-called "phantom limb" is included in a body schema (Stolin, 1983, p.212). It is obvious that body schema and representation of one's own body are different categories, however, both of them refer to the question concerning the borders of one's body.

The answer to the question concerning "my body" is quite paradoxical, as Tkhostov puts it: "The answer to the question of what "my body" is, on the one hand, seems to be self-evident, since everyone can uncontroversially define what is "my" body and what is not. But, on the other hand, when I try to do so, I am immediately confronted with rather difficult questions. How do I determine what belongs to me and what belongs to the world? I am aligned with my body, but sometimes it refuses to obey myself. Are my hair and nails parts of my body?" (Tkhostov, 2002, p. 62).

Second, the important transformation of the body happens during the socialisation process, namely, a body as a natural entity becomes a sociocultural one. The numerous studies realised in the field of psychology of corporeality provide the empirical evidence of this transformation (Kazanskaya and Meshcheryakov, 2012; Nikolaeva, Arina and Leonova, 2012; Tkhostov, 2002; Tkhostov, 2020). The value of these studies is explained by the fact that they revealed the ontogenesis of corporeality from the point of view of cultural historical tradition, in other words, the transformation of the natural body into the cultural one goes by the same way as do the mental functions to become the higher mental functions (Kazanskaya and Meshcheryakov, 2012; Tkhostov, 2020).

Body: a representational perspective

There is a theoretical tradition where the body is considered as a privileged topic (Jodelet, 2015). We are talking about the theory of social representations (SRs). Among the numerous definitions of the SRs done by Moscovici the preference could be done to the one where the SRs are seen as: "systems of values, ideas and practices with a twofold function...: first, to establish an order which will enable individuals to orient themselves in their material and social world and to master it; and secondly to enable communication to take place among members of a community by providing them with a code for social exchange and a code for naming and classifying unambiguously the various aspects of their world and their individual and group history" (Moscovici, 1973, p. xiii). The SRs are socially produced and shared. The existence of a SR refers to the existence of a group that communicates about an object, event or phenomenon that are new, unknown, strange or threatening and produces the SR about it by transforming the strangeness of these objects, events or phenomena, by putting them into the existing frame (Moscovici, 1976). The object of the SR is a complex and polymorphic entity. The SRs perform some other functions, namely: regulation of social behaviour and justification of social relations, construction and management of social identity.

Before going ahead, the relevance of this theoretical framework to study the body issues should be highlighted: the body is considered as a social-cultural entity, as a social construction, the particularities of modern society are taken into account.

It was already underlined that body was a complex and polymorphic entity at the intersection of a numerous dimensions, among others: natural-social-cultural; individual-social; body-soul; flesh-spirit; private-public; visible-invisible; decent-indecent; real-virtual; health-illness.

This social psychological tradition provides an opportunity to analyse how the "amateur" scientist (or so-called "naive scientist from the street") develops his/her own explanatory theories about the world around himself/herself. This interest of the "amateur" scientist towards the world is explained by the need to predict and to control this world, to reduce its uncertainty. It is quite clear that the quality of these naive theories is inferior to scientific knowledge in terms of its rationality or rigour, however people actively produce this knowledge and use it in their everyday life.

Following the ideas proposed by Moscovici, it should be said that the "notorious man from the street" cannot come up with naive explanations of the world on his own; these explanations are formed in the numerous communications (Moliner, 2001). These communications take place at several levels (Moliner, 2001): from interpersonal communication with significant others to cultural communication.

In the era of visual culture (Rose, 2014) with the omnipresence of visual discourse, the iconic entities dominate the conceptual ones. The mass media actively use this strategy of influence by broadcasting this component. The emergence and widespread of the new social media are the greatest transformation of communication and interaction processes (Kende et al., 2015). The participants of communication mediated by the new technologies have equivalent statuses, their power positions in the communication process are interchangeable. Not only information but also impressions, evaluations, feelings and emotions are shared and exchanged (Buschini, 2016; Marzouki, 2016). These two aspects become particularly important in relation to the formation of SR of body.

A review of the numerous studies concerning the SRs of body reveals the effort of the researchers to answer a variety of questions, whether it is the particularities of SRs of body in different ethnic and professional groups; the relationship between SRs of body and SRs of health, ageing and AIDS; gender-specific SRs of body; and of SRs of body and nutrition in women after 75 years old, the impact of social practice (physical trainings) on SRs of body (Camargo et al., 2011; Camargo and Wachelke, 2010; Costalat-Founeau et al., 2002; de Souza-Filho and Beldarrain-Durandegui, 2009; Goetz et al., 2008; Jodelet, 2015; Souza et al., 2019).

It was revealed in the studies on SRs of health and illness that body was an element of SRs (from Herzlich first works to contemporary studies (Aim et al., 2018; Herzlich, 1973; Silveira, Camargo and Giacomozzi, 2021)). In the research on SRs of beauty, it was revealed that the possibility to change one's body through certain surgical interventions in order to meet the standards was normalised (De Rosa, Homlan, 2011).

Just as Herzlich has claimed that the transformation of SRs of health and illness is associated with the progress of medical technology (Bovina, 2007), it seems possible to think about transformations in the SRs of body related to the development and widespread usage of technology in the modern world (especially the ones to correct and change the body).

Some remarks on the interlinkage in between beauty, health and body demonstrated in the research on SRs could be stated here. The relation between health and body is evident, as far as it is a kind of the societal requirement to be healthy and to have a healthy body. The normative pressure is stronger for

women than for men. The relationship between health and beauty looks understandable as well: health has positive attributes and beauty is one of them (it is an illness that spoils and disfigures the body) (Bovina, 2007). Finally, beauty is also a normative attribute of the female body (Moscovici and Vignaux, 1994). As a result, it is not surprising that the two elements that are systematically presented in the SRs of body are *beauty* and *health* (Camargo et al., 2011; Camargo and Wachelke, 2010; de Souza-Filho and Beldarrain-Durandegui, 2009; Goetz et al., 2008; Souza et al., 2019). Taking into consideration the SRs of body in women, a simple question could be raised: Are beauty and health stable elements of SRs in groups of women of different ages?

In order to answer the question a study was conducted, its aim was to reveal how the body was represented in groups of young and older Russian women.

The presented study was exploratory in nature, and it justified the fact that no precise hypotheses were formulated in advance. However, we suppose to find the differences in the hypothetical structure of the SRs as a matter of age. These differences should be found in the case of all objects of the SRs (my body, ideal body and female body). With the reference of the results obtained in the studies on SR of body (Camargo et al., 2011; Camargo and Wachelke, 2010; de Souza-Filho and Beldarrain-Durandegui, 2009; Goetz et al., 2008; Souza et al., 2019), namely, concerning the persistence of the elements “health” and “beauty” in SRs of body, it would be expected that for the young participants the SRs of body would be crystallised around the elements concerning beauty and the ways to get it, for the older participants the SRs of body would be crystallised around the elements concerning health and its maintenance.

Materials and Methods

Participants and procedure*

A total sample consisted of 314 Russian females (N=258 females formed the group of young females from 18 to 25 years old, Mage=19.73, SDage =1.56; N=56 females formed the group of older females aged from 39 to 55 years old, Mage=45.63, SDage =4.68). The snowball technique was used in order to recruit the participants, they were invited to fulfil the online version via Google Form.

Measures

In line with the theory of SRs, the main tool to reveal the content of SRs was free association technique (Abric, 2003; Moliner and Monaco, 2017). The participants were asked to produce 5 words or expressions that came immediately to their minds while they were thinking about each of the stimuli (my body, ideal body, female body). In order to reveal the evaluative connotation of each answer, the participants were asked to evaluate each answer on a scale from -3 to +3. The participants were asked several questions in order to obtain the social-demographic information.

Representational structure analysis

The present study was based on the ideas of the structural approach that operationalises the idea concerning the SR organisation (Abric, 2003). SR consists of a core and a peripheral system (Abric, 2003; Moliner and Abric, 2015). Core part of SR, being rooted in culture and crystallised in the value system shared by group members, it is maintained through collective memory (Abric, 1993). This part of SR has several functions: to give meaning to SR, to organise it, and to provide the stability of SR (Moliner and Abric, 2015). The peripheral system of SR serves to concretise the meaning of the core part. This part is characterised by variability and changeability. If the core part is formed by a few elements, the peripheral system consists of a larger number of elements (Moliner and Abric, 2015). Due to variability, the peripheral system permits SR to adapt to the changing context. If the core part is “stable, coherent, consensual and historically marked” (Abric, 1993, p. 76), the peripheral system is “flexible, adaptive, and relatively heterogeneous” (Abric, 1993, p. 76).

The main analysis of the obtained data was realised by using the prototypical analysis. The key idea of this analysis was that the core elements of the SR were more salient in comparison with non-core elements (Abric, 2003). The operationalisation of this idea required the usage of the two parameters, namely: frequency of an association (it refers to quantitative parameter) and appearance ranking of an association (it refers to qualitative parameter) (Flament and Rouquette, 2003). The combination of the two parameters reveals the hypothetical structure of SR (the core zone, the contrasted elements zone, the first and the second peripheral zones). The core zone of SR is formed by the elements with high frequency and low appearance ranking, the potential core elements (“candidates to the central core”

* The presented study is a part of a much larger research project. The only part of the obtained data is presented here.

(Lo Monaco et al., 2016) are situated here). The contrasted elements zone is composed of the elements with low frequency and low appearance ranking. As Abric put it concerning this particular part of the SR: "There are themes stated by few people (low frequency), but who consider them very important. This configuration may reveal the existence of a minority subgroup with a different representation <...> But we can also find here <...> a complement of the first periphery" (Abric, 2003, p. 63). The first peripheral zone consists of the elements with high frequency and high appearance ranking. The zone could be defined as a kind of afterthought in relation towards the object of the SR. Finally, the second peripheral zone unites the elements with low frequency, high appearance ranking. These parts of the hypothetical structure of SR would be described and analysed below. In addition to the key parameters of the hypothetical structure of the SR the indicator of the evaluative connotation of each association was also used.

It needs to be highlighted that even the combination of these two parameters could be seen as an indicator of the centrality of elements, nevertheless, the prototypical analysis reveals almost the hypothetical structure of SR that should be verified in a supplementary empirical study (Lo Monaco et al., 2016).

The prototypical analysis was used in order to reveal the hypothetical structure of the SRs in the two groups of participants for each object of the SR. The free-associations data matrix was composed of words evoked by at least 10 % of respondents. The analysis of the data matrix was realised by using the IRaMuTeQ software (Moliner and Monaco, 2017).

Results

Before going into detailed description of the results obtained in the prototypical analysis, some comments should be stated here. If we look at the whole data obtained in the two groups associated with the object "my body", several ideas come to our mind. They coincide with what is described in the literature by linguists, in particular, it concerns the difficulties of describing the body (Kabakova and Compt, 2005). As it could be seen in the dictionaries of Russian language, the meaning of the lexeme "body" varies (it is about the external form and internal structure, about whether or not to include the human soul, what is the composition of the body, whether the head is included or the body is identical to the torso?) (Kabakova and Compt, 2005). It seems that the body parts have different statuses in culture, which is reflected in language (Kabakova and Compt, 2005). Some body parts are tabooed, as if they should not be mentioned in the description of one's own body, while other parts of the body are more neutral, acceptable for discussion.

The frequencies of these concepts are low (in case of SR of my body in the group of young women the frequencies are following: legs - 23, hands - 19, torso - 16, head - 14, hair - 9, soul - 5, conscience - 4, in group of older women: head - 9; hands - 8; legs - 7; torso - 5; soul - 4) and they are not included into the main analysis, which includes the concepts mentioned by 10% of respondents. These results perfectly meet the claim of Tkhostov, discussed above (Tkhostov, 2002).

SRs of body in young women

My body. The core zone of the SR in case of the object my body (see Table 1) is formed by the only element with the positive valence (+1.5): my choice. This element needs some particular attention: on the one hand "my body, my choice" (in Russian: moe telo-moe delo) is a feminist slogan that refers to individual rights on determination concerning the bodily autonomy of women. On the other hand - putting aside the activism ideas, it is still a means to refer to bodily autonomy, a way to protect self from open discussion with others.

The contrasted elements zone (see Table 1) does not consist of any element. Taking into account the idea of Abric about the minority position (Abric, 2003), this fact could reinforce the content of the core zone of the SR.

The first peripheral zone includes the only element with the highest positive connotation (+2.5) - beautiful. It is a normative element associated with the body, however, it is thought by respondents for the second time.

Finally, the second peripheral zone unites the two elements with positive valence (+2.0; +2.1) - health and temple. These themes correspond to the individual experience and serve to contextualise the core elements. The element temple could be seen as another means to protect self.

Ideal body. The core zone of the SR of ideal body (see Table 1) consists of the two elements with the positive valence (+2.6 and +1.5 accordingly): healthy, slender. The presence of the element healthy in the core zone is not surprising, it is a normative element; and this fact corresponds to the results of the

numerous studies (Camargo et al., 2011; Camargo and Wachelke, 2010; de Souza-Filho and Beldarrain-Durandegui, 2009; Goetz et al., 2008; Souza et al., 2019).

The contrasted elements zone (see Table 1) unites the following elements: toned, sportive, slim, muscular, good skin. The connotation of these elements varies from neutral (+0.9) to positive (from +1.8 to +2.1). If we follow the thesis that the minority position is located in this zone (Abric, 2003), we can talk about a kind of opposition between the two versions of the ideal body: on the one hand, beautiful and slender (in the case of the majority position - core elements), and on the other - slim, with good skin and athletic body (the theme of athletic body implies the effort in order to get the ideal body). If we follow the other thesis and the elements of this zone are considered as the complement of the first peripheral zone (2003), it is possible to think that beauty is the result of effort and it does not look like the traditional feminine body.

Another observation concerning the content of this zone of the SR: the three elements concerning the athletic body (toned, sportive, muscular) could be seen in two directions. On the one hand, it looks like the ideal body is not seen as feminine one, but as masculine one as well (at least by a part of the respondents). On the other hand, it is a kind of resistance to the traditional way to see the ideal body (as feminine).

The first peripheral zone includes the only one element with the positive connotation (+2.2) - beautiful. It is a normative element associated with the body. As in the case of the SR concerning the own body, this attribute is seen by respondents in the second place.

The second peripheral zone consists of the two elements with the positive valence (+2.3;+2.7): loved and strong.

Female body. The core zone of the SR of female body (see Table 1) has only one element with the positive valence (+2.4): beautiful. Once again, it is not surprising because this is a normative element and it corresponds to the results of numerous studies (Camargo et al., 2011; Camargo and Wachelke, 2010; de Souza-Filho and Beldarrain-Durandegui, 2009; Goetz et al., 2008; Souza et al., 2019).

Table 1

My body, ideal body and female body in SRs of younger Russian women (hypothetical structure of SR revealed by prototypical analysis)

	My body (57.25;2.02)**	Ideal body (49.80;2.53)	Female body (54.57; 2.57)
Core zone* (high frequency, low appearance ranking elements)	my choice (92;1.5;+1.5)***	healthy (104;2.5;+2.6) slender (78;2.2; +1.9)	beautiful (123;2.5;+2.4)
Contrasted elements zone* (low frequency, low appearance ranking elements)		toned (39; 2.1;+2.1) sportive (37;2.4;+2.0) muscular (32;2.3;+1.8) slim (32;2.4;0.9) good skin (27;2.3;+2.1)	breast (51; 2.2;+1.5) shapes (34;2.3;+1.7) waist (28;2.5; +1.7)
First peripheral zone* (high frequency, high appearance ranking elements)	beautiful (69;2.4;+2.5)	beautiful (82;3.0;+2.2)	soft (55;2.6;+2.3)
Second peripheral zone* (low frequency, high appearance ranking elements)	health (36; 2.5; +2.1) temple (32; 2.1;+2.0)	loved (37;2.9;+2.7) strong (30;2.8;+2.3)	gentle (48; 3.0;+2.3) elegant (43;2.9;+2.4)

Note: «*» - the four zones of SR hypothetical structure were revealed by the usage of rank-frequency method [6;24];

«**» - for each object of the SR the average frequency and rank are indicated in brackets

«***» - frequency, average rank of occurrence and average valence for each element are indicated in brackets [6;24]. Valence varies from - 3 to +3; several segments could be distinguished: negative [-3; -1], neutral (-1;+1), or positive connotations [+1;+ 3].

The following elements are situated in the contrasted elements zone (see Table 1): breast, shapes and waist. The connotation of these elements varies is positive and it varies from +2.2 to +2.5. Once again following the minority position thesis, we can think that there is an opposition between the majority and a minority vision of the female body: abstract beauty VS visualisation of feminine shapes (breast and waist). Based on the opposite thesis, according to which it is a complement to the first peripheral zone, it turns out to reinforce the image of the feminine body in combination with its softness (the only element of the first peripheral zone with the positive connotation (+2.2)).

The second peripheral zone consists of the two elements with the positive valence (+2.3;+2.4): gentle and elegant.

Overall, the content of the core zone and the peripheral system in case of the SR of female body corresponds to the logic evoked by [Moliner and Abric \(2015\)](#) concerning the expressive properties of core and peripheral elements. The core elements are the general characteristics of the SR object (in our case - beautiful), they are abstract, and almost unconditional beliefs. The peripheral elements are: specific, concrete and contextualised, conditional beliefs. In the case of the SR of female body - the abstract beauty gets the concretisation in the elements: breast, shapes, waist, soft, gentle and elegant.

SRs of body in older women

My body. The core zone of the SR in case of the object my body consists of the only one element with the positive valence (+2.0): health (see Table 2). On the basis of the available research ([Camargo et al., 2011](#); [Camargo and Wachelke, 2010](#); [de Souza-Filho and Beldarrain-Durandegui, 2009](#); [Goetz et al., 2008](#); [Souza et al., 2019](#)), this fact is to be expected.

The three elements with the positive valence (from 1.4 to 2.2) form the contrasted elements zone (see Table 2): figure, my choice and strong.

The thesis concerning the opposition between the majority and minority positions seems more meaningful in this case than the thesis that the contrasting zone elements and the first peripheral system are a single whole (composed by the element beautiful (+2.3)). In other words, health VS reference to bodily autonomy, a means to protect self from the discussion with others.

The fact that beauty is less important (associated with the body secondarily) was expected.

The second peripheral zone unites such elements with the positive valence (+1.5;+2.1) as skin, head, hands. These elements refer to the individual experience, their function is to contextualise the abstract core elements (health is visible in the elements of the second peripheral zone).

Ideal body. The core zone of the SR of ideal body (see Table 2) consists of the two elements with the positive valence (+2.6 and +2.4 accordingly): healthy and slender. The situation of the element healthy in this part of the SR in the case of ideal body is not surprising, it is a normative element; and it was revealed in the numerous studies ([Camargo et al., 2011](#); [Camargo and Wachelke, 2010](#); [de Souza-Filho and Beldarrain-Durandegui, 2009](#); [Goetz et al., 2008](#); [Souza et al., 2019](#)). The surprising point is that the elements of the core zone are identical to those in the case of the young woman. This point will be discussed in the next section.

The contrasted elements zone (see Table 2) includes the following elements: muscular, good skin, sport. These elements have a positive valence that varies from +2.2 to +2.5. Once again there are the two possibilities to understand this empirical fact: to oppose the majority and minority positions or to reunite the content of the contrasted elements zone with the elements of the first peripheral zone. If we apply the first thesis, we can talk about a kind of opposition between the two visions of the ideal body: beautiful and slender VS muscular, good skin and sport. The minority position reveals the effort (sport) in order to get the ideal body. If we apply the second thesis, it is possible to think that beauty (the first peripheral zone includes only one element - beautiful (+2.6)) is a result of effort.

Once again as it was already noticed in the group of young women: the element concerning the muscular body could be seen in two directions. On the one hand, it looks like the respondents were not associating the ideal body with the female body (at least some of them). On the other hand, it is a kind of resistance to the traditional feminine body image.

The second peripheral zone consists of the following elements with positive valence (from +2.1 to +2.9): sportive, young, flexible, strong.

Table 2
My body, ideal body and female body in SRs of older Russian women (hypothetical structure of SR revealed by prototypical analysis)

	My body (10.50; 2.44)**	Ideal body (15.20; 2.62)	Female body (10.56; 2.52)
Core zone* (high frequency, low appearance ranking elements)	health (17;2.4;+2.0)***	healthy (32;2.1;+2.6) slender (22;2.3; +2.4)	beautiful (22;2.1;+2.6) breast (13;2.4;+1.9) soft (11; 1.8; +2.5)
Contrasted elements zone* (low frequency, low appearance ranking elements)	figure (10;2.3;+1.4) my choice (7;1.6;+1.5) strong (6;2.0;+2.2)	muscular (8;1.9;+2.5) good skin (7;2.3;+2.3) sport (6;2.5;+2.2)	gentle (9; 2.4;+2.9) smooth (6;2.5;+3.0)
First peripheral zone* (high frequency, high appearance ranking elements)	beautiful (19;2.8;+2.3)	beautiful (30;2.8;+2.6)	slender (14;3.0;+2.8)
Second peripheral zone* (low frequency, high appearance ranking elements)	skin (10; 2.6; +1.5) head (9; 2.6;+2.1) hands (6; 2.7;+2.0)	sportive (15;3.0;+2.1) young (12;3.1;+2.5) flexible (12;3.6;+2.9) strong (8;3.1;+2.8)	flexible (8; 3.2;+2.6) healthy (6;2.8;+2.7) seductive (6; 3.3;+1.8)

Note: «*» - the four zones of SR hypothetical structure were revealed by the usage of rank-frequency method [6;24];

«**» - for each object of the SR the average frequency and rank are indicated in brackets;

«***» - frequency, average rank of occurrence and average valence for each element are indicated in brackets [6;24]. Valence varies from - 3 to +3; several segments could be distinguished: negative [-3; -1], neutral (-1;+1), or positive connotations [+1;+ 3].

Female body. The core zone of the SR of female body (see Table 2) is formed by the elements with positive valence (from +1.9 to +2.5): beautiful, breast, soft.

The contrasted elements zone (see Table 2) unites: gentle and smooth (+2.9 and +3.00 correspondingly).

The only element of the first peripheral zone is slender (+2.2).

The second peripheral zone consists of the two elements with the positive valence (+1.8;+2.7): flexible, healthy, seductive.

Overall, the content of the SR of female body reflects the feminine body with the corresponding attributes. The disappearance of the element health is noteworthy. This object is less idealised than the two other ones.

Discussions

It should be kept in mind that the presented study was exploratory in nature, and it justifies the fact that no precise hypotheses were formulated. However, we suppose to find the differences in the hypothetical structure of the SRs as a matter of age in the two groups. These differences should be found in the case of all objects of the SRs (my body, ideal body and female body). With the reference of the results obtained in the studies on SR (Camargo et al., 2011; Camargo and Wachelke, 2010; de Souza-Filho and Beldarrain-Durandegui, 2009; Goetz et al., 2008; Souza et al., 2019), namely, concerning the persistence of the elements "health" and "beauty" in the SRs of body, it would be expected that for the young participants the SRs of body would be crystallised around the elements concerning beauty and the ways to get it, for the older participants the SRs of body would be crystallised around the elements concerning health and its maintenance.

The comparison of the hypothetical structure of SRs (my body, ideal body, female body) of in the same age groups of Russian women reveals several points concerning the lay mentality: in the lay mentality of young women concerning the body the own body is "protected" from the reflection, in the case of the ideal body an effort (physical training as it is implicitly presented) should be done in order

to transform a body into the ideal one. The female body (seen as feminine one, almost beautiful with feminine attributes) does not need any effort. Femininity is the attribute of the female body. It is surprising to see that the element health is not a part of the hypothetical structure of the SR of female body.

In the lay mentality of older women concerning body, the own body is seen as more healthy than beautiful one; in the case of the ideal body an effort (physical training as it is implicitly presented) should be done in order to transform a body into the ideal one (healthy and slender). The female body (seen as feminine one, beautiful with feminine attributes) does not need any effort. Femininity is the attribute of the female body. It is surprising to see that the element health is a part of the second peripheral zone of the hypothetical structure of the SR of female body.

The comparison in between the two age groups gives only partial support to our general assumption concerning the differences in the hypothetical structure of the SRs of body (my body, ideal body, female body), namely: beautiful, this normative element was not situated in the core zone neither in the SR of my body, nor in the SR of ideal body. Another normative element healthy, was situated in the core zone of the SRs of my body and ideal body, but not in the SR of female body in the group of older women.

The core zone elements in the case of the SR of ideal body are identical in the two age groups. This is the most surprising result of the study, but it could be seen as the mass media influence. The popular glossy magazines use quite the same idea relating body-beauty-health. The popularity of the fitness centres that help to get the desired body, the new social media with possibilities to broadcast the images of the beautiful body together with the scripts how to get it (easily and quickly) etc. In the SRs of body in the two generations of Russian women all these attributes of the modern conceptualisation of the body were revealed.

Only one element (beautiful) reveals a match in the case of core zone elements in the two age groups in the case of the SRs of female body. The female body seen by older women was more feminine than the one seen by the younger ones.

Finally, taking into account the point that the two objects of the SRs, my body and ideal body are the ones that are associated with stronger normative pressure in comparison with the object female body, then one paradoxical conclusion could be drawn: the normative discourse connecting sport and health, the necessity of an effort in order to have ideal body (almost athletic, sportive) disappears in another context (female body) where the abstract beauty of the body is represented by the quite traditional vision of the body.

Conclusions

The aim of this study presented here was to reveal how the body was represented in groups of young and older Russian women. In line with the key ideas of the theory of SRs and the research methodology of the structural approach an exploratory study was conducted.

The detailed analysis of these SRs leads to a conclusion about certain particularities of the lay mentality of the body in the two age groups of Russian women: in the lay mentality of young women concerning the body the own body is "protected" from the reflection, in case of the ideal body an effort (physical training as it is implicitly presented) should be done in order to transform a body into the ideal one. The female body (seen as feminine one, almost beautiful with feminine attributes) does not need any effort. Femininity is the attribute of the female body.

In the lay mentality of older women concerning body, the own body is seen as more healthy than beautiful one; in the case of the ideal body an effort (physical training as it is implicitly presented) should be done in order to transform a body into the ideal one (healthy and slender). The female body (seen as feminine one, beautiful with feminine attributes) does not need any effort. Femininity is the attribute of the female body.

The study has several limitations; first; it is related to the fact of the disproportion of the age groups; second, the usage of a single instrument to evoke the SRs of body in the two age groups reveals the only hypothetical structure of the SRs.

As it was mentioned, this study is a part of a larger research project, however, being limited by the articles parameters, the results obtained on the males were not presented here. The comparative analysis between two age groups in females and males could shed light on the particularities of the results presented here.

To conclude, a further study to verify the hypothetical structure of the SRs of body in young and older Russian women is the aim of the next step. Moreover, the same analysis as the one presented here in case of young and older females will be done with the data obtained in the male sample in order

to reveal the hypothetical structure of the SRs of body. Finally, the further study in order to verify the hypothetical structure will be realised as well in male sample. Only then will we have the empirical results for making claims about the SRs of body, rather than considering only the hypothetical version of a naïve understanding of the body in the two generations.

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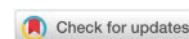
Conflict of interests

The authors declare no conflict of interest.

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Instruments of Empathy-Shaping in the Creation of a Culture of Peace and Non-Violence

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Abstract: Empathy as a human trait that gives the ability to understand, respect, and share the feelings of other people is one of the most important elements in building a secure society and a culture of peace and non-violence. The level of empathy in individuals is influenced by endogenous and exogenous factors, and it has an affective and cognitive dimension. The aim of this paper is to investigate the concept of empathy, the extent of influence of endogenic and exogenous factors, to investigate the influence of three main elements in the development of empathy in children and youth, namely family, school, and media, and to investigate the degree of correlation between empathy and creation and maintaining a culture of peace and nonviolence. The methods used in this paper are quantitative and qualitative content analysis, comparative analysis, historical method, analogy method, and analysis of primary and secondary sources. The research confirmed the importance of empathy in the development of a culture of tolerance, dialogue, respect for opposing opinions and goals, respect for diversity, and non-violent response to conflicts. All these elements are simultaneously elements of a culture of peace and non-violence, and therefore the conclusion is that empathy is one of the preconditions for building a culture whose goal is a safer and more humane society that provides greater security from physical destruction than a culture of war and aggressive problem-solving. The authors conclude this paper with recommendations for the three main pillars of shaping empathy in children, namely family, school, and the media.

Keywords: empathy, endogenous and exogenous factors of empathy, family, education system, media, the culture of peace.

Introduction

Society and its achievements define the way of life of people, their mutual relations, and the dynamics of those relations. Each new iteration of a society and social relations, which are a consequence of either progress or regression, brings certain changes in the way of life of the members of that society. Some things remain the same, whether they are the product of human nature or civilizational postulates, while some other things change, whether radical or subtle changes, rapid or slow, changes to which large groups of people or specific smaller groups are exposed. Sometimes social changes are so massive and comprehensive that we call them industrial revolutions, behind which, as a rule, stand a certain technological invention and innovation. From the First Agricultural Revolution (or Neolithic Revolution), which enabled the emergence of the first civilizations, to the Fourth Industrial Revolution, which is currently underway, huge changes in the way of producing material life have led to changes in lives and interactions and relationships between people. Although the benefits of changing production methods are enormous, those changes also bring negative things. Already during the First Industrial Revolution, there were concerns about the alienation of man from man, and this alienation became deeper with each major change. During the Third Industrial Revolution, which, among other things, brought us the Internet and ushered the world into the Information Age, it seemed that the connection inherent in the very nature of this technological invention would bring people closer and reduce alienation. But something paradoxical happened - people became more connected than ever, and communication became easier than ever, but the process of alienating man from man continued and deepened. Although through a

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permanent connection to the global network they have in some way become constantly together, people are essentially alone. But alienation not only results in loneliness but also has its much more harmful manifestations. Today's scientific and technological progress has made impressive, one might say revolutionary achievements of technical progress. Electronic media, universal computerization, mobile phones, music, traffic, and many other technical benefits, created "allegedly" to make life and work easier for modern man, not only represent this alienation as a specific category, which is nurtured and received in man "new age", but they direct them and force them not to treat other people as personalities (Bjelajac, 2014). If a person is alienated from other people, they can very easily be alienated from nature, as we can see in numerous examples of environmental destruction that seem to alarm an insufficient number of people to create a critical mass to stop this devastating trend, the trend that may result in the fact that those who will come after us will have nothing left, and that the heritage of modern man will be a completely destroyed global natural habitat.

Another dramatic but practically hidden consequence of human alienation is the growing lack of empathy in people. Empathy, roughly understood as a lack of ability to understand and share the feelings of others, is one of the most important elements in building and maintaining a humane society and culture of peace, non-violence, and security. If we start from the perhaps utopian assumption that society should be fair and equal for all, and that scientific and technological development aims to improve the quality of life of each individual involved in these changes, then any change that results in reduced levels of understanding between human beings does not lead to the achievement of the aforementioned goals. Only a society made up of individuals who are able to share other people's feelings, especially of those who are weaker or less influential, can be justly, truly progressive, and globally united in the purpose and activities that are derived from that shared purpose, aimed to improve their own well-being, but also for the betterment of their environment, community, and society. If that doesn't exist, then it's a bit pointless to explore space and colonize the planets of the solar system, because even if they go thousands of light-years away, people will carry the same flaws that prevented them from building the best possible society in their original habitat. An element of fundamental importance for creating the best possible society is empathy, and some developed societies have realized that, so they have introduced the study of empathy as a separate school subject in the educational system at all levels. As the level of empathy in people generally depends on several factors, the aim of this paper is to define the concept of empathy, explore the proportions of endogenous factors and environmental influences on the development of empathy, to explore the influence of family, school, and media in shaping empathy in children and youth, as well as to explore the importance of empathy for the creation, development, and maintenance of a culture of peace and non-violence, which is an extremely important element of human survival and maintenance of living conditions worthy of man. The basic hypothesis of this paper is that empathy is crucial in creating a culture of peace and non-violence, as well as in raising the quality of human life and social interactions, which is an important factor in the overall life satisfaction of each individual. The methods used in the preparation of this paper are quantitative and qualitative content analysis, comparative analysis, historical method, analogy method, and analysis of primary and secondary sources.

Empathy - between endogenous factors and environmental influences

Empathy is primarily a personal relationship with people and situations in which human emotions are expressed, but deeply conditioned by social circumstances, the context in which the situation takes place. In the not-so-distant past, the most vulnerable social groups, such as children, were (mis)used and exploited in the most brutal way without any empathy or concern for their suffering, which is unthinkable today (although even today, unfortunately, hidden from the public eye and out of the reach of legal sanctions, there is brutal exploitation of children for economic, sexual, political and other purposes).

Empathy is a very complex and multidimensional phenomenon. To date, there is no clear consensus on what empathy is and what phenomena are associated with it. To get a clear and unreduced picture of empathy, all these phenomena should be viewed as separate but mutually conditioned and closely related. The most common approaches in empathy studies are based on the differences between the two basic dimensions of empathy, namely affective empathy and cognitive empathy.

Affective empathy (Cuff et al., 2016) deals with emotional experience caused by emotional stimuli, while cognitive empathy is the ability to understand or rationalize other people's feelings. The affective component is what is inherent in empathy and refers to the affective state caused by the sharing of emotions and emotional states of another person (Banissy et al., 2012). This aspect of empathy focuses on the emotional processes of empathy and defines it through experiencing and sharing emotions. When

discussing affective empathy, one should always keep in mind the complexity of human emotions.

The cognitive approach to empathy gives priority to cognitive processes, which include understanding other people's feelings, situations, and circumstances, taking on roles, and seeing the world "through the eyes of others". Many scholars who emphasize this aspect of empathy believe that cognitive empathy precedes affective empathy (Banissy et al., 2012).

Definitions of empathy that encompass both the cognitive and affective dimensions note that "although empathy involves emotional resonance between the empathizer and the object of empathy, it is also characterized by maintaining a clear cognitive and experiential boundary between the two, so the empathizer can always distinguish his thoughts and feelings from others" (Hollan, 2012).

The organization of neural activities of the brain during evolution has enabled the emergence of certain human behaviors, such as empathy. Empathy plays an important role in the survival of the species and increases the likelihood of remaining in a social group. However, during evolution, humans have developed several separate neural systems whose combination and cooperation allow for complex behavior in social interactions, such as the development of emotional and social intelligence (Banissy et al., 2012).

Emotional intelligence is the ability to recognize, identify, understand, control, and use feelings to express thoughts. Emotional intelligence describes the ability to effectively maintain the connection between emotions and opinions, to use emotions to facilitate reasoning and to think intelligently about emotions (Mayer, Caruso and Salovey, 2016).

Daniel Goleman singled out five essential components of emotional intelligence:

1) Self-awareness – is an essential component of emotional intelligence and refers to the recognition of their own feelings at the time when they are expressed, as well as the willingness to realistically assess their own abilities.

2) Self-control - Self-control is based on self-awareness and represents the ability to overcome and manage emotions.

3) Self-motivation - channeling emotional excitement into action energy directed towards the desired goals, taking responsibility, and willingness to persevere in what we have set as a goal.

4) Empathy - recognizing emotions in other people. Empathetic people are sensitive to almost invisible social signals that indicate what others want, how they feel, or what they need. Namely, empathy represents the readiness and ability to feel what other people feel, as well as the ability to mentally put ourselves in their place within its frame of reference.

5) Social skills - relationship management, ie. interpersonal skills (Goleman, 1995).

Here we see that empathy is only one of the elements of emotional intelligence as a much more complex and broader concept than empathy itself.

Social intelligence starts from emotional intelligence as self-reflection and follows how it is further reflected in interpersonal relationships. Social intelligence is reflected in dealing with emotions in specific social situations, developing harmonious relationships with others, developing sensibilities for other people's needs and desires, developing active listening, and all those qualities that we attribute to a "good" person. For the world to be better, it is necessary to start from the development of the social intelligence of the individual and reach the social intelligence of the society, which is today recognized and studied as social capital.

Rudimentary forms of social intelligence and empathy can be found in the behavior of some primates, such as caring for offspring, and organized group life, which can be considered an evolutionary precursor to empathy. However, what is specific for people is the development of the prefrontal cortex, i.e., the ability to rationalize reality as the development of self-awareness and awareness of others, self-regulation of emotions, ability to speak and understand language, sharing emotions, all leading to prosocial behavior and altruism. among people. In addition to the cortex, other biological systems vital to empathy have evolved, such as the autonomous nervous system and endocrine system, and especially the amygdala, which plays the most important role in the evaluation and regulation of emotions. Anatomical differences (Banissy et al., 2012), as well as genetic and developmental factors (Eisenberg and Morris, 2001), explain some variability in empathic abilities. In addition, other dispositional factors such as gender and education were observed.

Various neurochemical compounds participate in the formation of empathy. Research has shown that a large number of neuropeptides are involved in social behavior related to attachment or empathy, including oxytocin, vasopressin and opioids, dopamine and serotonin (Gonzalez-Liencre, Shamay-Tsoory and Brüne, 2013). Some analyzes have shown that genetic factors make up to 35% of the variance

of empathy. Researchers have even isolated specific genes that contribute to the likelihood of inheriting empathy, while certain metabolic conditions such as hunger, fatigue, lack of sleep, and pain reduce the empathic response (Watt, 2007). Medical practice and research, especially in neurology and psychiatry, have shown that in some psychological and brain pathologies, empathy is reduced and shows deficits. In general, low empathy is usually associated with damage to the frontal or prefrontal cortex, especially the right hemisphere. Research shows that if a person has not been exposed to enough affection and the exchange of empathy in the parent-child relationship and has not developed empathic skills accordingly, this can later be the cause of reduced empathy capacity. There are also certain psychopathological conditions that are accompanied by a deficit of empathy: autism, behavior and personality disorder, psychopathy, schizophrenia, Parkinson's disease, dementia...

As can be seen, an empathic response is subject to various endogenous factors, i.e., factors of individual differences, but also to a multitude of exogenous, situational factors. These include a positive relationship between the observer and the other person, the degree of closeness (siblings, guardians, best friends), similarity (personal attributes, biological and social background), belonging to the same group (nation, race, religion, sports team), assessment fair play of others, assessment of the helplessness of others, assessment of the emotional state of others (aggression and negative emotions of another person inhibit the observer's empathy as opposed to pain and suffering), social comparison through assessment of others' social status, wealth or success (Bošnjaković and Radionov, 2018).

It is very important to identify and analyze the diversity of cultural frameworks, social situations, and political-economic conditions that either suppress and inhibit basic empathy or reinforce it more precisely and systematically.

The influence of family, school, and media in shaping empathy in children

Security culture is an umbrella term that includes the culture of peace and non-violence as one of the extremely important elements. Security culture and its functioning are closely connected with collective and individual changes that take place in society and the state. It acts by expanding the range of human knowledge from various fields of science and technology, expanding knowledge of the types and levels of new hazards, their dynamics, and possible transformations. Accordingly, in modern conditions, purposeful work on the promotion and implementation of security culture in all spheres of public and private life should be specially organized educational and humanistic activities of the state, school system, teachers, and students, aimed at forming a person of safe and secure type (Bjelajac and Filipović, 2021a). If in this recommendation we place special emphasis on peace education and empathy as a fundamentally important element of successful peace education, as an integral part of broader security culture and the process of forming a safe type of personality, we can also identify the carriers of the process of shaping empathy in children and adolescents. These carriers are - the family, the school, and the media, and each of them has an important, different but complementary role in this process. Of course, the adoption of the basic rules of safe living must begin in the family. This means that the child needs to be taught the basics of life security that will enable them not only to coexist safely in society later, but also to permanently build a security culture necessary for coexistence, and when the time comes, they form their descendants as safe individuals. Thus, through the continuity of security education, safe personalities, safe families, and, finally, a safe society is permanently created. It should be quite clear that full and irreversible security culture is permanently formed through a certain set of knowledge, abilities, and skills that young people acquire as a result of pedagogical interaction with the school within the school program on the basics of life safety (Bjelajac and Filipović, 2021a). Analogous to this quote, and because empathy is a fundamentally important component of adopting the principles of security culture, and thus the culture of peace and nonviolence, we can say that the process of shaping empathy in children begins in the family, learning and adopting elements of understanding, respecting and sharing other people's feelings, first members of the immediate and then the extended family and immediate environment; and in the case of the correct shaping of empathy within the family, at the moment when the child enters the educational system, it is this system that should enable the continuity of shaping empathy through specially created compulsory school contents. Just as the continuity of security education ensures the permanent creation of safe personalities that form safe families that form a safe society, so the continuity of education about empathy ensures the permanent creation of safe individuals who have a high level of empathy, which will lead to a critical mass at the same time to safe, but also to a humane, pacifist society in which understanding and dialogue will be the basic means for approaching and resolving conflicts at all levels.

We mentioned earlier that empathy is a very complex concept. Some scholars study empathy

within the framework of a much more complex and multidimensional theory of moral development and explain moral behavior in terms of self-awareness, socialization, empathy, autonomy, moral reasoning, etc. The affective aspect of empathy focuses on the emotional processes of empathy and defines it through experiencing and sharing emotions, where "emotions are most often caused by evaluating or evaluating events, in relation to everything we consider important: our goals, our worries, and aspirations. They give intensity to our lives and are partly based on our cultural contexts and what we consider socially acceptable" (Outli, 2005).

Empathy is especially subject to discuss if we keep in mind exogenous factors in the formation of empathy. Exogenous factors include the influence of the environment, where we primarily mean the geographical, national, religious, civilizational, ideological, class, racial and other affiliations of empathizers. All these factors, and many others, affect the formation of value systems, worldviews, prejudices and other personal characteristics of empathizers. The basic definitions of empathy are relatively imprecise and arbitrary, and probably biased towards the forms of empathy expressed in the European and North American contexts and their dominant value systems. Also, a very important factor is the exposure to the media, especially new media on the Internet, to which we will pay more attention.

From the very beginning, the traditional mass media have had an informative, educational, and entertaining function. The power of manipulation that they had was very quickly noticed and applied primarily for commercial and political purposes. The concentration of ownership of the mass media on a global scale has made them a powerful weapon of manipulation of public opinion, attitudes, emotions, and empathy. Empathy can be manipulated, especially for political purposes, in crisis situations such as war conflicts. If the empathizer adopts some of the preferences of the person or group of his empathy under the influence of the media, it is likely that aversions towards the other side have also been adopted. The mass media have a particularly large influence on public opinion and emotion-al-empathic response because they establish authoritative unilateral communication with the masses and generally identify with official government positions. When it comes to the role of the media in creating a culture of peace, we think that it should be noted with regret that the media have little chance and opportunity to dedicate themselves to this humanitarian goal. In the first place, it should be borne in mind that for the vast majority of media, income is the basic driver, the reason for its existence, and a kind of determinant of editorial policy. Revenue and revenue opportunities increase with the number of users of that medium (viewers, readers, listeners). Increasing the audience can be influenced by the credibility and quality of information and content, but it is a much longer and more arduous path, and with that, with the increase in the number of information circulating between interconnected users, credibility is becoming more and more relative. Sensationalism, which has always been one of the most important factors in attracting new media audiences, has gained additional importance in the era of the primacy of new media. In addition, in the flood of information, the audience usually watches the head-lines and only then may read the rest of the text or watch/listen to the rest of the media content. Therefore, media whose success, or even existence, depends on the size of the audience that is directly related to the number of advertisers and the price of advertising space are more inclined to report on conflicts than tolerance, and in such a set of things, it is very difficult to adjust the editorial policy to the goals of creating and promoting a culture of peace, even if there is a consensus and the will to do so (Filipović, 2021).

Since the emergence of new social media and the so-called virtual communication that is not based on face-to-face relationships, conclusions about the negative impact of this type of communication on the socialization and empathy of the generations growing up on these media began to appear. Such conclusions were based on the basic lack of communication on social networks, and that is the absence of non-verbal communication and the impossibility of developing the affective component of empathy.

Modern definitions of empathy are more complex and stand out through the cognitive, affective, and physiological processes that underlie it, which gave rise to the establishment of a quantitative index of empathic ability. There have long been developed scales for measuring the coefficient of empathy, so that opened the possibility to really determine how new media and the Internet affect the level of empathy of all age groups, especially adolescents who grow up on these media. The first scale, the Hogan Empathy Scale, was created in 1969. Today, however, the IRI scale (Interpersonal Reactivity Index) or Inter-Personal Reactivity Index is most used. The most common measured aspects of empathy were perspective, fantasy, empathic concern, and personal distress. PT scale (understanding perspective) measures the process of taking on a role, and the tendency to adopt the psychological points of view of others. The EC scale (empathic concern) measures the tendency to experience feelings directed at others and the response to anxiety in others with a reactive response of sympathy and compassion. FS scale (fantasy) measures the tendency to transpose oneself into the feelings and actions of fictional characters. The PD (personal distress) scale is designed to highlight one's own feelings of personal discomfort and

discomfort as a reaction to the emotions of others (Bošnjaković and Radionov, 2018).

The results of the conducted research mostly rejected all hypotheses that assumed that with the increase in the use of social media and the Internet, empathy decreases, i.e., no significant connection between the use of social media and empathy has been established. Also, research has shown that there are no differences in the intensity of expression of emotions between online communication and face-to-face communication, as well as a significant difference in the development of affective and cognitive components of empathy using social media. Adolescents often use social media to practice social skills and successfully transfer those skills to offline interactions. The use of social media has been shown to have positive effects on adolescents as it gives them the opportunity to share emotions with others and understand their feelings. Regarding the use of Facebook, the results of the research suggest that people who are actively involved in Facebook show higher ratings of empathy, increased self-esteem, and life satisfaction, as well as increased empathic concern.

Despite efforts to support evidence that the use of the Internet and social networks reduces empathy, this has not been proven. New generations are growing up with new technologies and new ways of communication, and it has always been so. The Internet and interactive Web 2.0, on which social platforms such as Facebook were created, enable unlimited interactive multilateral communication, exchange of views, ideas, emotions, life philosophies, dialogue, argumentation, and even quarrels and conflicts of opinion. This is a huge step forward in relation to the centralized mass media and the unilateral authoritarian rule of opinion and information. For decades, the mass media have been "burying" the audience with bad news, placing false and ridiculous values (reality shows), and promoting people unworthy of public attention. This could not reduce empathy, but it significantly helped to create "emotional fatigue" when our brain turns on defense mechanisms and rejects this information, dulls the senses, and thus avoids empathic response. Variations in empathic responses may be greater or less given the many factors we listed (endogenous and exogenous), which is normal, but the absence of empathy is a psychopathological phenomenon with deeper causes.

It is ungrateful to arbitrarily appreciate the overall level of empathy in society, the ability of people to empathize with other people's emotions, and to put the helpless under their protection, which is the basic and expected outcome of empathy. On the other hand, it is an indisputable fact that the global society, the whole civilization, is in the biggest crisis in history so far and that it is certainly sliding towards a very uncertain dystopia. The circumstances in which we live are so complex that it is almost impossible to rationalize them, take a stand towards them and correctly direct our own empathic response. Although globally networked and connected, the individual must, as never before, take personal responsibility for building a culture of peace and non-violence, not agree to be manipulated by other people's interests, and direct his empathic response in the right way. Empathy is just one of many factors that affect overall life satisfaction, happiness, and personal and overall social prosperity, but it is extremely important for the healthy and progressive coexistence of people.

The fundamental importance of empathy in creating a culture of peace and nonviolence

Empathy is fundamental in creating a culture of peace and nonviolence. People are social beings who share their lives with others, and understanding other people's mental states, especially emotions, desires, thoughts, behaviors, and intentions, affects the way they engage in social interactions. Empathy facilitates understanding of our social environment, anticipating the behavior of other people, and is necessary for healthy coexistence, mutual understanding, and cooperation between people. Empathy influences our motivation through prosocial behavior, altruism, compassion, and care for others, inhibits aggression, and is the foundation of morality. As such, empathy attracts scientists from various scientific fields such as philosophy, sociology, psychology, medicine, neuroscience, etc. (Bošnjaković and Radionov, 2018). The human brain is a modular organ full of adaptive cognitive structures, most of which are unique to the human species. These are innate forms of cognition, but also an emotional reaction to cognition, which is also typical. We are not born with preinnate ideas about morality and empathy, but there are innate cognitive predispositions as well as emotional reactions that condition and enable the formation of ideas about morality and the development of empathy towards other people.

Human nature is characterized by a growing number of various needs. The quality and quantity of these needs have changed throughout history. Marx said that the wealth of man is reflected in the wealth of his needs. "The issue of human security is conditioned by the question, what are human needs? Philosophers see human needs as a powerful source for explaining human behavior and social interaction.

People need a few basic things to survive, including the physical and non-physical elements needed for human growth and development, as well as all the things that people innately want to achieve” (Bjelajac, 2021). Whether we are supporters of the concept of the hierarchy of needs or the concept of cumulative action of multiple motives and needs on human behavior, one thing is certain: the need for security, both physical integrity and personal integrity, is at the top of every person’s needs and motives. We can give the need for security an ontological character, and place it outside any classification and hierarchy of motives because without it every other activity has no meaning or context. In modern rule of law, the issue of security takes on dimensions of security regulated by law. The motto of the Enlightenment woven into modern states is “laws make us free”.

From the Magna Carta Libertatum from the beginning of the 13th century, the British Glorious Revolution of 1688, the American Revolutionary War of 1776, to the French Bourgeois Revolution of 1789, and many national liberation movements, the European and then the world order of sovereign states emerged. Citizens entered a contractual relationship with the state, exchanging their unbridled freedom and a state “in which life was miserable, short and uncertain” (T. Hobbes) for security and certainty guaranteed by the state with its authority and monopoly on physical coercion, for the implementation of which its mandate was given by the citizens themselves. At the same time, starting with the division into Whigs and Tories in the English Parliament during the 16th century, through the division into left and right parties in the French Assembly after the revolution, then the first, second, and third internationals, a modern European political field emerged, bringing politics into the lives of modern European citizens. When we finally add the utopia of free-market competition created by Adam Smith and his work “The Wealth of Nations”, according to which the “invisible hand of the market” will make the most rational allocation of resources in the interest of the whole nation, we find all elements that marked modern history. It was a time of hope, as Woodrow Wilson put it in the early twentieth century, in which we need to “make the world safe for democracy” where peace, democracy, and a market economy are the preconditions for social prosperity. (This insistence on peace as one of the three presuppositions of prosperity was the greatest objection to Wilson’s concept, because at that time war was still considered a legitimate and unquestionable way of pursuing the interests of states.).

UNDP, in its Human Development Report (UNDP, 1994) comes out with the concept of human security. The individual is placed in the center of the security space, and the responsibility for his security is lowered from the exclusive state level to the regional and local level as well, with many more actors than before. Security threats are no longer just issues of threatening borders, nuclear catastrophe, and war, but also threats arising from the consequences of sudden globalization. These are unequal economic growth north-south, rising poverty because of the market economy and deregulation of national legislation, environmental catastrophe, uncontrolled money flows, terrorism, religious fundamentalism, etc. Human security is a relatively new paradigm for approaching the security problem. Compared to traditional security concepts based on the territorial integrity and sovereignty of the state, human security is based on the fact that the security of each individual is essential for the creation of peaceful and stable societies (Bjelajac, 2021).

The UNDP concept of human security recognizes seven aspects of human security:

- a) economic security
- b) food safety
- c) environmental security
- d) health safety
- e) personal security
- f) community security
- g) political security (UNDP, 1994)

So what is the future of a culture of peace and non-violence? Simply put, a culture of peace is a culture that promotes peaceful diversity. Such a culture includes lifestyles, beliefs, values, behaviors, and accompanying institutional arrangements that promote mutual care and well-being, as well as equality that includes respect for diversity, governance, and equitable sharing of resources. This offers mutual security to humanity in all its diversity through a deep sense of species identity, as well as kinship with the living earth. There would be no need for violence (Bjelajac, 2021).

Is it really possible to achieve such a goal, today when society is atomized, when states have completely lost their sovereignty and terminated the social contract with their citizens when informal organizations lead humanity into an uncertain (perhaps really “better”) utopian/dystopian future, when war has once again become a legitimate means of achieving some, most incomprehensible goals? At the

same time, the rest of humanity is becoming a global “clan community” left to itself, connected, networked, informed, and increasingly aware of common destiny. Will the upcoming economic, energy, environmental, health, in one-word, general crisis succeed in provoking a common empathic response of the world’s citizens and mobilize them to “disagree” and build a global culture of peace and non-violence, or will empathy be suppressed by apathy, and will its future be left in the hands of those who think they have a sure solution to their problems? This danger is real, and there are a handful of historical precedents for it, especially since it is much easier to stand with a dominant leader or political or national structure, and through that homogeneity caused by fear and apathy to avoid the efforts and uncertainty of individualism for a better community. It is an abstract way of saying “building a safe and humane society of peace and non-violence through the adoption and adherence to the principles of empathy and security” in which the central role is played by the individual, at whose level all these processes and principles must be adopted.

Discussion

One of the possible solutions for moving towards a culture of peace and non-violence is to implement empathy in education systems. Peace education is an essential component of quality primary education. It is equally important in conflict and unstable societies, where children are helped to cope with the trauma of war, manage and resolve conflicts and build dialogue processes to better understand the “other”, and in more stable and prosperous societies, where empathy develops as the ability to understand the emotions of others (e.g., migrants and other socially vulnerable groups). Practice suggests that such an approach can contribute to reducing racism, discrimination, and prejudice, with an emphasis on social cohesion and building a successful multicultural society, despite significant cultural and religious diversity ([Bjelajac and Filipović, 2021b](#)). In some Scandinavian countries, we have an example of implementing empathy in school syllabi, where children systematically learn to understand and share the feelings of others, with the goal that future generations have ingrained values that contribute to the sustainability of a humane society that is both a society of peace and nonviolence.

Economic prosperity is one of the most important factors for building positive empathy, especially if social wealth is at least approximately equally distributed among all members of the community. The impact of material well-being can have an ambivalent effect on empathy. On the one hand, it can lead to individualism as a life philosophy based on egoistic hedonism, which is certainly not an environment for the development of empathy (which is increasingly proven by practice in the most economically developed countries through deep alienation and disinterest in others), and on the other hand, personal economic and material well-being can be a stimulus for empathic participation in people’s problems related to poverty and suffering caused by any reason.

Human beings behave as beings who strive to maximize individual benefit, but also as beings who see themselves as part of a wider social group. Trust is nothing but the expectation of some members of the community that other members will behave regularly honestly and cooperatively on the basis that they share common values with them. Social capital is usually transmitted through cultural mechanisms such as religion, tradition, and customs. Trust is an ethical category and as a common language of good and evil of a nation, trust and collective empathy are acquired through the history of nations, especially concerning socio-historical circumstances in which a nation created its ethos - its language of good and evil. In that light, we would tie the mentality to behavior or attitude towards ourselves, the people around us, and the community. Social capital is an even narrower term and is related to the society of commodity production, especially to capitalism and the market economy, because it implies the influence of the ability to associate and form spontaneous social groups on the creation of new value (for individuals and communities). In that case, social capital becomes a resource in addition to money, raw materials, and labor as classic resources that otherwise participate in the creation of new value. Thus, we can define social capital as the ability of people to work together with mutual trust and empathy to work together for common purposes in groups and organizations and thus create new value.

The ruling ideologies during the 19th and 20th centuries brought with them very coherent value systems, especially those related to the economic aspects of social life. The issue of property, social distribution of wealth, class divisions, but also social and cultural policies, directly affected the level of trust, social capital, and thus empathy among people. But since all ideologies are “political ideologies”, i.e., behind general and common interests, partial and personal interests were hidden, despite the ideals they carry (whether liberal or communist), they were always ultimately a factor of social conflicts, mistrust, and disintegration. It was certainly not an environment for the development of empathy as a necessary factor of social integration and a culture of peace.

All this leads us to the conclusion that there is a direct correlation between a high level of empathy and the creation and maintenance of a culture of peace. In an era of rapid technological development that has direct implications for social structures and life, and which aims to improve the quality of life and work of people, it seems that humanity has reached a sufficient level of development and civilizational values that we can think of developing a sustainable society a consequence of the development of a sustainable culture of peace and non-violence. In this regard, if we identify the individual, family, school, and media as the most important factors in this endeavor and identify the need for the development of empathy in individuals that must be nurtured while the individual is a child, then we can single out family, school, and media as carriers of empathy in individuals, and propose certain recommendations that would help achieve that humanitarian goal. The family, as the basic cell of society, and at the same time the initial and most important element of raising children, has a role to teach the child to recognize, understand, respect, and share the feelings of others - firstly family members and then the child's immediate environment. Of course, if in the next step, i.e., when the child encounters the next factor in the process, there is no upgrade to what was learned in the family, even without meeting the opposition within the new environment, the process will be interrupted and possibly annulled. Therefore, the next factor - the education system - is extremely important for this process. Recommendations for the education system could be that at the kindergarten level, educators continue to teach children empathy by implementing its principles in their educational and upbringing methods. At the primary and secondary school level, it is recommended that the study of empathy as a separate subject be included in the syllabi, according to the model already used in certain countries. In that way, the continuity of shaping empathy in children and young people would be ensured, and for it to take place in the educational environment, with a scientific component that would contribute to the theoretical adoption of the principle of empathy, it is possible to additionally upgrade the knowledge and skills acquired in class through practical work and field visits and identify the need for possible additional didactic methods in order to increase the efficiency of empathy education. As for the role of the media in this process, we have already mentioned that their real power to actively work towards achieving this goal is extremely limited and that it is easy to promote a culture of peace and empathy in a period of peace and stability. However, when turbulence occurs, the media will always behave in accordance with the interests of its founders and financiers and will act residually on their audience in accordance with those interests. When we talk about new media, especially social media and Web 3.0, decentralization, and democratization, which is their main feature, directly disables consistent action, and so it is when we develop empathy and promote a culture of peace and nonviolence. This does not mean that these efforts should be abandoned, but only illustrates the challenge that really exists. On the other hand, there is a certain space for the useful work of the media in the function of developing empathy and creating a culture of peace, and the media can be used for that purpose. Therefore, what the media can do first is to desensationalize events and avoid a discourse that mimics war discourse. What the media also shall and can do is promote the elements and values that are an integral part of a culture of peace and non-violence, such as tolerance, dialogue, respect for diversity, respect for different and opposing opinions and goals, and this is the most important space in which the media can act to help create a culture of peace. Promoting these values would reduce the potential for violent conflict resolution of all kinds while reducing tensions in society and nurturing democratic and humanistic values (Filipović, 2021). It should only be added here that empathy is one of the most important elements and values that are an integral part of the culture of peace and non-violence, that the existence of empathy conditions and promotes tolerance, dialogue, respect for diversity, and respect for opposing views and opposing goals and that as such it should be intensively and creatively promoted through the media content of both traditional and new media.

Conclusion

Developing and continuously maintaining empathy in children and young people is one of the preconditions for building and maintaining a culture of peace and non-violence, and consequently, a safe and humane society. It should be borne in mind that the culture of peace, from the historical aspect, is the antithesis of the way of thinking, and even the structure of societies and states and their priorities, because almost until World War II war was thought of as the basic way in which states achieve their goals and progress. Even today, there are numerous opinions that aggression, violence, and wars have made a greater contribution to the progress and degree of today's development of civilization than peace has done. On the other hand, any conflict and violent approach to resolving them carries the danger of destruction and causes permanent damage to the largest number of individuals who participated in it and

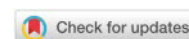
carries the inherent danger of physical destruction. Therefore, although violence is part of human nature, and precisely because people as a species tend to resort to it at the first sign of conflict, it is necessary to make a great effort to make a change in that sense, first temporary, and eventually permanent. Empathy is also part of human nature, although less common and less visible than violence, and by nurturing and developing empathy in children and adolescents we can take the first but extremely important step, initially in reducing the discrepancy in the frequency of violent and empathic responses to conflict, and further, towards a significant increase in the frequency of empathic response to conflict. If war is entropy, then peace is negentropy, and although negentropy may be in vain in the long term because entropy prevails in the end, isn't everything else that people do, build, and nurture, also negentropy? If humanity were reconciled with the transience of things and the inevitability of chaos and disorder, we would not have any civilization today, and with all the flaws and shortcomings, we have reached a degree of civilizational development that allows us to talk about peace and safe, quality life for all, and one of the most important elements of such a life is the high degree of empathy achieved in the critical mass of individuals.

Conflict of interests

The authors declare no conflict of interest.

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Trends in the Implementation of the Istanbul Convention

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Abstract: Violence against women and domestic violence has attracted a lot of attention of the scientific community over the last 30 years. During that period, this topic assumed a very important place in all international agendas and was tackled by the most important international organizations and associations. The Convention on preventing and combating violence against women and domestic violence, i.e. the Istanbul Convention, is one of the basic international documents which has had an influence on numerous legislations of European countries in the field of gender equality and domestic violence. The aim of this paper is to show by a comparative method and through analysis and review of available literature the advantages of the Istanbul Convention and its importance for gender equality through a review of the literature, and also to point out the criticisms attributed to it. Research results have shown that the difference between sex and gender equality is a stumbling block and a serious objection in countries with traditional, nationalist and hard autocratic regimes. Also, most European countries have fully implemented the Istanbul Convention in their legislation and thus significantly contributed to gender equality and protection of women from abuse and domestic violence. The discussion shall focus on the importance of adopting a new convention or resolution at the level of the United Nations (UN), which would cover all contentious issues related to violence against women and domestic violence, and which would be binding on all members.

Keywords: Istanbul Convention, violence against women, gender equality, domestic violence.

Introduction

Domestic violence and violence against women is a serious social problem of global proportions that most well-developed countries are tackling through various legal provisions and regulations. Women's rights to equality are classified as belonging to the domain of human rights, wherein violence against women in partnerships and intimate relationships is a violation of human rights and a form of discrimination. The issue of women's rights has been a matter of consideration for the whole world, but the first steps in their defence were made only after the activities of international organizations such as the United Nations, the African Union, Latin and South American organizations, followed by regional organizations from Europe such as the Council of Europe and the European Union. All these entities have created legally binding instruments with the aim of prevention of, fight for and protection of human rights (Stoica, 2017, p. 45). One of the most important international subjects and protector of women's rights is UN Women, which is supported by UN member states. This entity is important because it strives to set global standards for achieving gender equality and seeks to devise the laws, policies, programs and services necessary for the implementation of these standards in cooperation with Member States and the non-governmental sector (NGOs). They promote and fight for equal participation of women in all aspects of life, focusing on five priority areas (UNW):

1. Increasing female leadership; ending violence against women;
2. involvement of women in all aspects of security processes;
3. economic empowerment of women;
4. achieving gender equality;
5. planning and budgeting

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According to UN reports, one in three women worldwide experiences physical or sexual violence, mostly from an intimate partner. Violence against women and girls constitutes a violation of human rights, and the immediate and long-term physical, sexual and mental consequences for women and girls can be devastating, including death. Although women are its most common victims, domestic violence implies a range of serious consequences for children who may be direct or indirect victims of violence. What children see and hear during episodes of violence has a direct impact on their psychophysical development and can generate intense emotional reactions and internal conflicts (Počuča, 2010, p. 53). It is estimated that male survivors of domestic violence are up to 10 times more likely to be violent in an intimate relationship than men who did not have a history of violence in their childhood (Godbout et al. 2009).

Domestic violence can be physical, psychological, sexual, economic, and emotional, and there has been increasing talk about behavior control as a separate form of violence. These forms of violence are very rarely isolated and individual. There is almost no physical violence that is free from psychological torture, nor sexual abuse which does not result in physical injury and psychological harassment. Increasing attention is paid to a special type of violence against women and children, which is indirect, but can also cause numerous consequences for the psychological integrity of women and children, i.e. media violence and cyber bullying (Debarati and Jaishankar, 2016, p. 44).

Throughout history, we have witnessed that women have always been considered the weaker sex, that their participation in social life has been minimized, that they have been in a subordinate position and have always been targets of discrimination by men. Although gender stereotypes have evolved over time and the situation has improved in many societies, patriarchal social norms still prevail around the world (Simonović, 2014, p. 594). They are embedded in various social customs or discriminatory laws according to which the man is the head of the family and is dominant over the woman in all social categories. Due to all of the above, international organizations have been trying to establish mechanisms that will completely eliminate violence and discrimination against women and lead to gender equality. The UN has been at the forefront of efforts and implementation of measures and activities aiming to oblige its members to reduce the gap between men and women and contribute to the inclusion of women in all social processes at the same level as men. As a result of decades of experience in the work on promotion of women's rights, the United Nations General Assembly adopted the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) on 18 December 1979, which was the first document to most directly promote equality between women and men. The Convention defines discrimination as any differentiation, exclusion or limitation made on grounds of sex in political, economic, social, cultural, civil, or any other field. Another important international document which tackles the promotion of equality and protection of women in the world is the Beijing Declaration and Platform for Action adopted at the IV World Conference on Women in the UN in 1995, which is revised and monitored every 5 years based on reports from around the world. This document represents the international community's commitment to achieving gender equality and providing better opportunities for women and girls in addressing civil, political, social, economic and cultural inequalities. Its achievements are still relevant today and have been implemented in numerous legislations around the world. What is typical of both documents is that they deal with gender equality and equalization of women's rights with men, but they do not tackle specifically violence against women and domestic violence. This accounts for the need to make the problem of violence against women and children, the problem of domestic violence, the subject of a special document which will strictly define the rights and obligations of countries to work on protection of women from abuse legally and through the creation of measures and programs. As a result of scientific and professional observation and monitoring of the state of women's inequality in the world, neglect and negligence, violence in partnerships, the Council of Europe adopted in Istanbul in 2011 the Convention on preventing and combating violence against women and domestic violence (the Istanbul Convention). The objectives of this Convention are: to protect women from all forms of violence and to prevent, prosecute and eliminate violence against women and domestic violence; to contribute to combating all forms of discrimination against women and to promote essential equality between women and men, including empowerment of women; to develop a comprehensive framework, policies and measures to protect and assist all victims of violence against women and domestic violence; to promote international cooperation with regard to eliminating violence against women and domestic violence; to provide support and assistance to organizations and law enforcement agencies in effective cooperation in order to adopt a comprehensive approach to eliminating violence against women and domestic violence (COE, 2014). The Istanbul Convention was the basis and cornerstone on which most European Union countries based their legislations in the domain of protection of women from violence and domestic violence, sexual abuse and harassment, rape, forced marriage, child marriage, genital mutilation and other forms of violence against women and children. These criminal acts constitute a serious violation of human rights. However, the Convention was also met with abundant

criticism which questioned it, especially in countries with traditional and nationalist social systems. Certain European Union countries have not ratified the Convention with various explanations, but most commonly as the result of actions and opposition of ultra-conservative nationalist movements opposing women's equality. In recent years, there has been a serious delay in the implementation of the legacy of the Istanbul Convention, a regression in women's equality, and an increase in domestic violence, which, according to numerous studies, the COVID-19 pandemic has contributed to. Further on in the paper, we will try to point out the necessity of further implementation of the Istanbul Convention, but also to point out the shortcomings and debates in the European public concerning gender equality and protection of women and children from violence and domestic violence.

Definition of violence in the Istanbul Convention

Although in most modern societies domestic violence is prohibited and criminalized by law, reality points to the fact that it has become more evident in recent years and that it has a constant growth tendency, which can also be explained by the fact that victims are increasingly encouraged to report violence and that the dark figure of this phenomenon is decreasing (Merdović and Bjelajac, 2021, p. 186). What is considered violence between intimate partners and what are the criteria for defining it? In domestic and foreign literature, we encounter different terms such as violence against women, violence against wives, violence against an intimate partner, family violence, domestic violence. In some of these terms, it is clear that allusions are made to the violence of the husband against the wife, i.e. of the man against the woman, whereas the terms domestic violence and intimate partner violence show sexual neutrality. This was one of the reasons for presenting different arguments as regards definition of domestic violence.

The problem of inequality and discrimination against women has become the center of attention of the international public since the 1970s. From that period to date, debates have been conducted regarding gender equality and equality between men and women. Equalizing women with men in terms of political rights (giving women the right to vote), limiting the husband's power over the wife in marriage, women's right to manage their property independently, reforming views on divorce, abandoning traditional religious beliefs about a woman's obligation to accompany her husband constitute the basic catalysts in the fight against domestic violence (Počuča and Šarkić, 2020, p. 322). International documents have laid the foundations of today's laws regulating the areas of violence against women and domestic violence. It is clear that a significant breakthrough has been made in the context of understanding domestic violence, especially due to the rise of feminism in law and other social disciplines in the late 1970s. Above all, feminist movements have played a dominant role under the auspices of the UN and have made significant strides in the protection of women from violence and abuse. One of the broader definitions of feminism entails a social movement and an academic approach which aims to ensure gender equality, with a special focus on inequality in relation to women (Baron and Past, 2005). Feminists underline a clear distinction between sex and gender as separate categories. The sex of a woman is a matter of biological or physical difference in relation to men. Gender, on the other hand, is conceived as a culturally constructed spectrum according to which the identity of both women and men is shaped. Until the emergence of feminist movements, violence between intimate partners and spouses was considered a private and personal problem between two people. Such acts and violent behaviors were thought to be a consequence of personality disorders which could be addressed through counseling and psychological treatment (Houston, 2014). The concept of violence against women and domestic violence was defined in different ways, but each definition also had certain shortcomings. The general recommendation of the United Nations Committee on the Elimination of Discrimination against Women (CEDAW) stated that gender-based violence is "violence directed against a woman because she is a woman or which proportionally affects women" (Article 6). The 1993 UN Declaration on the Elimination of Violence against Women states that violence against women means any act of gender-based violence which results in or which is likely to result in physical, sexual, or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of freedom, either in public or private life (UN, Declaration on the Elimination of Violence against Women, 1993). We encounter similar formulations in domestic literature. According to one of them, domestic violence is defined as continuous use of physical and psychological force against family members, while endangering and violating the domain of security and trust bonds and expression of control and power over family members, regardless of whether applicable legislations stipulate such behavior as a criminal offense and whether the perpetrator of violence has been reported to the prosecuting bodies (Konstantinović-Vilić and Nikolić-Ristanović, 2003, p. 128). Domestic violence constitutes a model of violence and control that simultaneously includes physical, psychological

and sexual violence, as well as various forms of economic dependence (Mršević, 2011, p. 61). Most definitions include primarily physical violence, although other forms of violence are not negligible and have serious consequences for the victim. Factors that contribute to the occurrence of domestic violence must also be taken into account when defining it. Research shows domestic violence to be a multicausal phenomenon where isolated action of one factor is ruled out. These factors can be divided into four categories (Golu, 2017, p. 38):

Cultural factors:

- Determining gender roles
- Belief in the superiority of men
- Values that offer men the right to "own" women
- Defining the family as an environment in which the man has control
- Marriage traditions
- Perception of violence as a method of conflict resolution

Economic factors

- Economic dependence of women
- Limited access to credit offices
- Discrimination in terms of property division
- Limited access to the labor market
- Limited access to education and medical system

Legal factors

- laws that do not support women's rights
- Laws on divorce and child custody

Political factors

- Violence against women is rarely discussed
- The family has a private character and the state cannot interfere
- Women's political organizations do not have the same power as men's political organizations

From the very title of the Istanbul Convention, "Convention on Preventing and Combating Violence against Women and Domestic Violence", it can be seen that violence against women and domestic violence are treated as two separate issues and problems. Therefore, both violence against women and domestic violence are in the focus of interest of the founders of the convention. One of the most significant contributions of the Istanbul Convention is that it provides the first legally binding definition of violence against women in Europe. In Article 3 of the Convention, "violence against women" means violations of human rights and forms of discrimination against women and represents all acts of gender-based violence that lead to, or may lead to, physical, sexual, psychological or economic harm or suffering for women, including threats of such acts, coercion or arbitrary deprivation of freedom, either in public or in private life. Domestic violence means any act of physical, sexual, psychological or economic violence that occurs in the family or household or between former or current spouses or partners, regardless of whether the perpetrator shares or has shared the same residence with the victim. By analyzing the definition of domestic violence in terms of this Convention, we can conclude that it covers two different types of violence. The first case is violence in intimate relationships between current or former spouses or partners, whereas the second is intergenerational violence that mainly occurs between parents and children. An equation sign cannot be placed between violence against women and domestic violence, because victims of domestic violence are also often men, as shown by numerous studies (Luthra and Gidycz, 2006; Straus and Ramirez, 2007; Jovašević, 2018).

The question as to what the priority of the Convention is and which form of violence is dominant, i.e. whether it is more protective of women or all victims of domestic violence was the subject of debate during the drafting of the Convention, but also later in the ratification process. The question arose as to whether gender-based or gender-neutral violence was a priority of the Convention and whether the Convention was equally binding with regard to both types of violence. It can be clearly concluded from the text of the Convention that priority is given to the elimination of all types of gender-based violence against women, including domestic violence. Article 2 states that the Convention is applicable to all forms of violence against women, including domestic violence, which disproportionately affects women as against men. It is also recommended that the Convention be applied to all victims of domestic violence, with

special attention to women victims of gender-based violence. Therefore, it is up to the signatory states whether they will pay attention to other victims of violence in the implementation of the Convention, but it is obligatory for women to be protected by legislative regulations and measures. The Istanbul Convention sees violence against women as both a cause and a consequence of gender power relations. In this context, criticisms of violence against children were somewhat neglected, although the consequences that children suffer and experience through various forms of abandonment and neglect are large and numerous in all aspects of child development (Bjelajac and Merdović, 2019). It states that violence against women is a manifestation of historically unequal power relations between women and men; that it is one of the crucial social mechanisms by which women are forced into a subordinate position compared to men; and that achieving equality between women and men is a key element in the prevention of violence against women (Allwood, 2016, p. 383).

As we have stated, the Convention is a legally binding document based on four pillars and it must be implemented on that basis in the laws of the states that have ratified it. These four pillars are prevention, protection, prosecution and coordinated policies, or 4Ps as found in foreign literature (prevention, protection, prosecution and adoption of policies).

Four pillars of the Istanbul Convention

Since the Convention is legally binding, it requires respect for the basic principles contained in it and harmonization of legislations and actions of the member states with the Convention. When we talk about the prevention of violence against women, clear guidelines are stipulated that must be respected by the countries that have ratified the Convention. The countries, including Serbia, must do everything possible to exert influence in view of changing the image of violence against women and achievement of gender equality in the society by means of public information systems and the media. This shall be achieved by the introduction of teaching materials and education at all education levels about equality between women and men, as well as non-violent communication and non-violent resolution of partner issues. Special emphasis is placed on raising awareness about the negative consequences which violence can reflect on women, but also on other victims of domestic violence. The Convention also requires the treatment of perpetrators of violence, which was a novelty that was not fully implemented. This novelty implies the creation and implementation of programs of work with perpetrators of violence against women and in the family, with the aim of preventing such behavior from repeating and the perpetrator adopting non-violent ways of solving risky situations. This points to the need of educating professionals working with the victims and perpetrators of violence in order to timely recognize violence, report violence and respond adequately to the violent act, primarily with the aim of helping and protecting the victim.

The protection of women and victims of domestic violence is one of the basic pillars on which the Istanbul Convention is based. The safety and needs of victims and witnesses must be at the heart of any protection measure adopted by a country. Women must be provided with information about their rights and the manner in which they can exercise their rights, they must be provided with free legal aid, access to counseling, legal, financial, health and social assistance. It is necessary to introduce free telephone lines that will be available to victims of domestic violence 24 hours a day, 7 days a week, where they will be able to report violence, get information on their rights, the manner in which they can protect themselves and whom they can turn to for help. It is essential for the countries that have ratified the Convention to provide safe shelters for women and children victims of violence where they will feel safe. One of the very important measures imposed by the Convention is the pronouncement of urgent measures that enable the police to immediately remove the perpetrator from the site of violence (house, apartment) and to prohibit them from approaching and communicating with the victim.

Prosecution of violence against women and domestic violence are matters the Istanbul Convention insists on and imposes the obligation on the countries that have ratified it to harmonize their legislation with the text of the Convention. This primarily refers to the criminalization of all acts of violence against women and children (physical, psychological and sexual violence, sexual abuse, stalking, female genital mutilation, forced marriage, forced abortion and forced sterilization) and prescribing criminal sanctions aimed at deterrence from committing violence and re-committing violence against women. The Convention requires the countries that have ratified to ensure efficient and effective response of all state bodies, especially the police which is the first to encounter the perpetrator and domestic violence, followed by the prosecutor's office, courts, social institutions and other actors dealing with violence against women and the family. The Convention solves one of the problems that has often occurred in practice, i.e. that the victim often renounces prosecution of the perpetrator. The Convention stipulates that the prosecution

and proceedings against the perpetrator may continue even if the victim withdraws. The Convention also requires that all relevant facts and qualified circumstances must be taken into account in the conduct of such proceedings, prosecution and determining the sentence. Although most countries have legally regulated criminal proceedings with children as victims or perpetrators, the Convention requires that children be specially covered and legally protected when they are victims of domestic violence or witnesses of violence. Special emphasis is placed on the need to protect the victim from condemnation, unnecessary and additional victimization, avoidance of confrontation of the victim with the perpetrator during the proceedings, prohibition of disclosing the victim's sexual history except when this is necessary in court proceedings. It is also necessary to provide the victim with all information on the course and outcome of the proceedings, provide free legal aid and professional assistance when necessary, instruct them about the right to appeal and compensation from the perpetrator or government body if they believe that their rights have been violated or endangered. Victims and their families must be protected from intimidation, retaliation and repeated victimization at all stages of the proceedings.

One of the special contributions of the Istanbul Convention is found in the constant coordination of all relevant actors in a country dealing with violence against women and domestic violence, but also in coordination and cooperation with other Convention signatories and other international institutions. This primarily refers to coordination and cooperation between the police, prosecutor's office, courts, local and regional authorities and non-governmental organizations, associations of citizens and all other actors which deal with domestic violence and violence against women. It is necessary to form a body that will coordinate and monitor compliance, perform evaluations and monitoring of the Istanbul Convention. In particular, they insist on the realization of projects and research to collect statistical data on the frequency of all forms of violence against women and domestic violence, implemented measures and their effectiveness, evaluation of these projects and exchange of data with other countries and international organizations. The aim of this exchange is to encourage cooperation and protection of women from violence at all levels and in all countries in a uniform manner and to eliminate violence or reduce it to a minimum.

Implementation of the Istanbul Convention in European countries

The Istanbul Convention is very important as it is legally binding and represents an important instrument of pressure on the signatory countries with a view to protecting women and victims of domestic violence. A special body which was formed and which represents a mechanism for the monitoring and control of the measures taken and compliance of the countries' legislations with the convention is GREVIO (The Group of Experts on Action against Violence against Women), while the European Court of Human Rights (ECtHR) is in charge of its implementation. This group of experts controls the countries which ratified the Convention, how far they have progressed in its implementation, and the compliance of the legal regulations with the Convention and its achievements. The states which ratified the convention were under two kinds of pressure. One kind came from the European institutions, the Council of Europe, the European Union and other international actors, and on the other side there were the non-governmental sector, the feminist lobby, citizens' associations and other organizations. As a result of this pressure, most countries ratified the Convention and harmonized their legislations with it. Although it was passed in 2011, it came into force in 2014 as it had to be ratified by 20 Council of Europe member states. The first Convention signatory was Turkey, which was of special importance due to the low status of women's rights in that country, but it was also the first country to withdraw from the Convention. Serbia was among the first countries to ratify the Istanbul Convention. It is a paradox that several European Union member states have not ratified the Convention to the present day (Bulgaria, Hungary, the Czech Republic, Latvia, Lithuania, and Slovakia), while Poland took steps to withdraw from the Convention, stating as the reason the attempt of the LGBT community to impose their gender ideas on the whole society. According to the Council of Europe data from 2019, the Convention was ratified by 34 countries, while 11 member states only signed it, without ratification. Russia and Azerbaijan are the only Council of Europe members that have not signed the Convention. In most East-European countries the Convention ratification process comes up against fierce internal resistance. The reactions of society in these countries are mainly related to fears of possible introduction of a gender ideology, and to the misinterpretation that the Convention is a step towards same-sex marriages. The most frequently quoted arguments for rejection of the ratification are non-compliance with the signatory state's Constitution, the resistance of ultra-right organizations, the pressure of conservative parties, the fear of threats to the traditional family, etc.

The Convention advocates the attitude that elimination of violence against women requires a holistic approach, which includes the achievement of gender equality. More extensive literature on gender

equality and violence against women demonstrates that the key factor in the realization of these aims is the involvement of civil society organizations in the implementation and formulation of the policy and measures (Krizsan and Lombardo, 2013). Most signatory countries have adopted the legal regulations which contribute to this fundamental position of the Convention. The signatory countries have adopted, under similar titles, the laws concerning the prevention and protection of women against violence and domestic violence. These laws define and criminalize conduct in cases of violence against women, and violence against other family members. They include the definitions of violence against women and domestic violence, and the definition of gender which has most often been the topic of controversial debates. Within criminal laws, individual criminal offenses have been criminalized and included which the Convention insisted on, and which had not been identified as distinct criminal offenses before (female genital mutilation). Most developed Western European countries (France, Italy, Spain) had even before the Istanbul Convention condemned violence against women and domestic violence under the influence of other international documents and instruments. However, the Istanbul Convention is the last, most comprehensive and binding document which has, so far, most accurately protected women's rights and women from violence. The Western Balkan countries have ratified the Convention, and brought their legislations at least partially into line with it. Most Western Balkan countries have adopted the Law on the Prevention of Domestic Violence with particular emphasis on the protection of women against violence, as women have, according to the available data, been disproportionately predominant as violence victims. Some countries do not have a distinct criminal offense, but fight against domestic violence through conducting procedures against the perpetrators for classic criminal offenses (Bošković and Puhača, 2019, p. 32).

A debate very often conducted in many countries, East-European in particular, is about the meanings of gender and sex. With regard to sex, we usually think of biological, bodily characteristics of men and women and their different reproductive roles. These differences have often been taken as the basis which determines the roles of men and women in further life and which brings women into a subordinate position regardless of their socio-economic status, race, culture, or ethnic origin. The concept of gender is of a later date and it implies the social shaping of the biological sexes of men and women determined by the understanding of their social duties (Torlak, 2011). It first appeared in American literature, but was accepted with time by all the international actors (UN, Council of Europe, EU). The concept of sex is used to define the physiological characteristics and anatomic differences between men and women, while gender denotes the social construction of gender roles (Mihaljević, 2016). Gender is a dynamic category which is subject to change and reassessment in different cultures and different social epochs, and which can have different meanings even in the same society, in different cultural settings.

The Istanbul Convention insists on the concept of "gender", specifying in art. 3 the socially defined roles, behaviors, activities and attributes which a society deems proper for women and men respectively. It was this structure that sparked multiple polemics as it was believed that in that way the LGBT community was trying to impose their values and attitudes, which was taken as threat to the traditional family and the traditional culture-specific ideas of marriage. In certain countries the advocates of same-sex marriages have lately been insisting on the introduction of the term of gender into textbooks and school teaching, which has been countered protests of the public and opposition to the Istanbul Convention (Poland, Bulgaria). However, the concept of gender and gender-based violence has come into use, and has in turn been applied in documents and legal acts of the countries which have ratified the Convention.

One of the forms of violence against women which the Istanbul Convention focused on in particular is violence against women in the name of honor, which dominated in conservative societies and is a reflection of culture-specific and other ethical norms. Insisting on the prevention of these forms of violence is very important due to frequent instances of female genital mutilation. One of the definitions of the "violence out of honor" phenomenon implies injuries to the physical or mental integrity or personal autonomy through threats or the use of violence committed by family members in the name of honor, the central element of which is the obligation of compliance to the sexual and social behavior which is the norm in the community (Grans, 2018, p. 137). The Convention stipulates that no culture, custom, religion, tradition or honor can serve as justification for any act of violence.

The most heated controversy in the scientific community has been caused by the condemnation of such forms of behavior, in particular those relating to the genital mutilation of women that the Istanbul Convention insists on. In our criminal legislation it is criminalized by art. 121a of the Criminal Code entitled "Mutilation of Female Genitals". Some other legislations such as the Criminal Code of the Republic of Srpska define it as "Female Genital Mutilation". While Serbia is criticized for failing to consistently apply the Istanbul Convention position, in the Republic of Srpska it is stated it was unnecessary, but that the Convention position was adhered to nonetheless. Special attention was devoted to the phenomenon

of forced marriages, which are also characteristic of certain social groups which justify them by their subculture and customs, and which often serve as grounds for violence against women and young girls.

The effect of the Istanbul Convention on the domestic violence situation in Serbia

Serbia was among the first countries to sign the Istanbul Convention, and ratified it among the first 20 in November 2013. As a member of the Council of Europe, it assumed all the obligations arising from the Convention and undertook to implement the Convention achievements in the legislative acts, but also realize them in practice. Domestic violence was for the first time criminalized in the Republic of Serbia Criminal Code from 2002 (art. 118a), after which it underwent certain changes in the Criminal Code of 2006 (art. 194). Domestic violence is one of the subjects tackled by the Family Law of 2005. In both cases through criminalization in the Criminal Code, the offense was classified in the group of criminal offenses against marriage and family. The difference lies in the object of protection, as it is evident that the Law from 2006 does not protect the family, but the individual as its member (Škulić, 2016). The legislator's aim was obviously to devote special attention to this kind of criminal offenses and improve the criminal-law protection in this area (Đorđević, 2007). Following the ratification of the Istanbul Convention, significant progress has been made in the building of the legislative, political and institutional framework for the implementation of all the Convention provisions. The accession negotiations conducted between our country and the European Union further step up the pressure of legal harmonization and cooperation with all the relevant international subjects in this area. In 2016 Serbia passed a separate law dealing specifically with domestic violence prevention, thus meeting one of the main Istanbul Convention requirements. The aim of this law is to regulate in a general and uniform way the organization and procedures of state authorities and institutions, thus enabling effective prevention of domestic violence and urgent, timely and effective protection and support to domestic violence victims. In other words, it does not exclusively deal with violence against women, but with protecting all domestic violence victims (children, men, other family members). The Law stipulates that prevention of domestic violence and protection and support of domestic violence victims and victims of crimes are in the domain of the police, prosecutors' offices, courts and centers for social work as state authorities, as well as other institutions in the field of child care, social care, education, upbringing and health. It also stipulates that other social actors and citizens' associations can also be an important factor in preventing violence and helping the victims. One organization which has been particularly prominent in fighting domestic violence and violence and discrimination against women is the Autonomous Women's Center (Autonomni ženski centar - AŽC), which has also been recognized by the state as an important partner in this area. AŽC's cooperation with international organizations and bodies has contributed to this organization's growing credibility and importance in all the activities concerning violence against women and domestic violence, primarily in protecting women against all kinds of discrimination. This organization has done and contributed a lot towards alleviating discrimination against and inequality of women in Serbia, as well as protecting women from all forms of abuse. The non-governmental sector is an important factor which, along with state authorities, makes a significant contribution in the form of protection and help to domestic violence victims. The Istanbul Convention insists on the inclusion of all the relevant actors with the aim of protecting women from abuse and protecting victims of domestic violence.

Alterations to the Criminal Code from 2016 recognized as crimes the offenses which had not existed in the law before, such as stalking, sexual harassment and female genital mutilation, thus further improving protection of women against violence, which represents further harmonization with the Istanbul Convention. Despite the legal measures taken and certain programs and projects aimed at preventing and censuring all forms of domestic violence and violence against women, it is assumed that the dark figure of crime is still high. The reasons for that are manifold, but the most commonly quoted are fear of the aggressor's retaliation and condemnation by the social community (Matijašević-Obradović and Stefanović, 2017), secondary victimization through media reporting, with sensationalist presentation of information which helps identify the victim and breach its privacy (Višnjić, 2012), culture-specific features and patriarchal social characteristics. As a result, numerous legal acts and action plans have been passed with the aim of preventing violence against women and domestic violence, and empowering women and the public to report violence so that it emerges from the silence where it is often concealed. In addition to the existing criminalizations, the development of science and technology has led to specific forms of violence against women which also have negative consequences for the victim's psychological and social life. This includes, first of all, aggressive forms of behavior on the internet and social networks (Meta, Instagram, Tik Tok, etc.). Sexual blackmail, threats, distribution of intimate photos and videos without the

consent of the person shown in them (the so-called revenge porn) online are a mechanism of violence against women and children, which has extremely negative consequences for the victim, which can even lead to the development of suicidal ideas. The consequences of pedophilia are especially negative, as one of the most pronounced forms of paraphilia, which is characteristic of all strata of society (Bjelajac, 2020). It follows from the above that Internet development enabled violence to be committed without direct contact, at long distances, from any place on the planet, to any person and often without the possibility to determine the identity of the aggressor hiding behind a false profile.

With a view to harmonizing our legislation to the Istanbul Convention, our country has adopted and amended numerous laws: [The Law on Prevention of Domestic Violence \(2016\)](#), alterations to the Criminal Code (2016) which recognize as crimes the criminal offenses of stalking, sexual harassment and forced marriage, the [Law on Free Legal Aid \(2018\)](#). Individual state authorities and institutions have also adjusted their activities to the obligations and responsibilities arising from the Istanbul Convention. The Council for combating domestic violence was thus formed within the Republic of Serbia Ministry of Justice, while public prosecution offices formed groups for coordination and cooperation, the Ministry of Internal Affairs set up a work group for combating domestic violence, and the 2019 job classification resulted in the formation of the Department for domestic violence avoidance and prevention, while a division for combating domestic violence was also established at the Police Administration level for the City of Belgrade. In addition, multiple strategies and action plans have been adopted, which specify the activities and obligations of state authorities and institutions regarding prevention and combating violence against women and domestic violence, as well as protecting violence victims. The ideas promoted through the media, which suggest that the adopted legal regulations, projects and strategies will solve the problem by the mere act of passing ([Stajić and Radivojević, 2018](#)), have led to the multiplication of legal regulations, without any significant results in the practical application of the relevant provisions. According to the statistical data of the Ministry of Internal Affairs, there was a rise in the number of criminal acts of domestic violence in 2021 compared to earlier years. The Law on Prevention of Domestic Violence stipulates the activities and obligations of police officers dealing with domestic violence cases. All the police officers have to hold specific certificates for acting in cases with elements of domestic violence, and are obliged to take several specific measures. The police officers face the delicate job of risk assessment in each particular situation, and the further course of the proceedings and protection of the victim against potential or actual violence most often depends on them. The urgent measures stipulated by this law are the culprit's temporary removal from the residence and temporary injunction banning them from contacting and approaching the victim. This is primarily aimed at protecting the victim, as opposed to the long-standing practice where the victim was, to avoid further violence, moved out of the shared residence and provided shelter such as temporary accommodation in a safe house ([Bošković and Puhača, 2019, p. 36](#)). The Law also stipulates measures and activities aimed at correcting behavior and providing professional help to the abuser with a view to developing nonviolent communication forms, but this has not been applied in practice so far.

As stated in the Strategy for Preventing and Combating Gender-Based Violence against Women and Domestic Violence for the period 2021-2025, even though considerable results have been made in the past period with a view to combating and preventing gender-based violence against women and domestic violence, these forms of violence are still widespread in private and public spheres of life alike. Along with dissemination of misogynous and sexist messages, sensationalist reporting on violence against women is still predominant in the media, while an insufficient number of media reports approach the gender-based violence phenomenon from an educational angle (United Nations Development Programme). According to research results ([Jovanović et al., 2020](#)), the predominant domestic violence victims are women. In addition, women from sensitive social groups (the Roma women, women with disabilities, women from rural areas, single mothers, women of different sexual orientation and gender identity) are at a higher risk of becoming victims of gender-based violence.

Conclusion

Despite all the efforts taken by international and local organizations, violence against women and domestic violence still represent a serious social problem with numerous negative implications for the victims, mostly women. The Istanbul Convention represents the basis and instrument used in endeavors to eliminate gender-based domestic violence. However, as we have pointed out, the success of combating violence against women and domestic violence primarily depends on the countries which have signed and ratified this Convention. Even in cases when the countries assumed the obligation of implementing

the Convention, there are ways to avoid and minimize its realization in practice. Although Serbia ratified the Convention and harmonized its legal acts almost totally with the requirements arising from it, women's rights and protection against violence in Serbia are not at a satisfactory level. This is demonstrated by the latest reports of international bodies which monitor the situation concerning women's rights and gender equality, which state that the programs and measures created for combating violence against women often fail to recognize that it is gender-based violence, which is a key obstacle for women enjoying human rights to the fullest extent.

The punishment of the abusers is an efficient method and a preventive measure in general, but insufficient to prevent and eliminate domestic violence and violence against women. The stipulated measures imposed on the abusers are only short-term and it is necessary to undertake activities aimed at preventing abusers and potential abusers from resorting to violence. This requires a multidisciplinary approach which would lead to a change of attitudes which support violence in society. A change of the collective awareness and culture-specific traits of our society, which are deep-rooted and related to gender-based violence and violence against women, should represent the basis of preventative action. Encouraging women to report violence and supporting victims in all stages of the procedure are the starting point in successful reducing of the dark figure of gender-based violence. Helping the victims financially also presents a problem which has been successfully solved in other countries, while Serbia has no clear and precise criteria on this issue. The treatment of the abuser after the act and helping them professionally in order to develop nonviolent communication and not repeat the act has remained mere words on paper, and invisible in practice, which leads us to the conclusion that the institutional and non-institutional treatment of abusers in the Republic of Serbia is either missing or only plays a secondary role. Although important steps have been taken towards harmonization of the legal regulations to the Istanbul Convention, there are segments in which this harmonization is not complete, and many bylaws and mechanisms for efficient implementation of the existing law are missing.

It is obvious that the Istanbul Convention itself has been increasingly subject to criticism, that it has not been ratified by several European Union member states, and that some countries which ratified it have announced withdrawal from it or have already withdrawn. For that reason, it is essential to work toward drawing up a similar document which would be adopted by the United Nations and binding on all the member states. References to a new UN convention are partly based on the argument that there exists a "normative gap" at the international level and that the adoption of the agreement and a new convention would contribute to lessening that gap.

Conflict of interests

The authors declare no conflict of interest.

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Case Study

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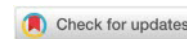
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Burnout Among Students of Technical Faculties in Serbia – A Case Study

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Abstract: Even though university students are not employees of the faculties, their academic duties (attending classes, taking exams, writing term papers and essays, and so on) can be considered as forms of work, whereby they engage socially with their teachers and other students, which is why student burnout has come into increased focus of numerous studies. The aim of this paper is to examine the relationship between gender, tuition fee status, and year of study and burnout among the students of basic academic studies at one of the public faculties in southern Serbia (N=194) using the School Burnout Inventory (SBI-U 9). The obtained results indicate that moderate exhaustion, cynicism, and the feeling of inadequacy are related to moderate burnout of the majority of the students. It has been determined that gender influences one burnout dimension – exhaustion, while the students' tuition fee status is related to cynicism and inadequacy, as is their year of study. This study also found that high degree of burn-out increases with the years of study.

Keywords: burnout, gender, student tuition fee status, year of study.

Introduction

The burnout syndrome was investigated for the first time by Herbert Freudenberger in the second half of the 20th century. The initial research was primarily concerned with the so-called helping professions, which are characterized by extensive social contacts, a high level of responsibility, and strenuous work effort (e.g. healthcare, social services, etc.). Burnout is most commonly defined as an inadequate response to occupational stress exposure, whereby employees feel exhausted and experience detachment from and negativity toward their job, accompanied by a feeling of reduced job efficiency “which can occur among individuals who work with other people in some capacity” (Maslach and Jackson, 1981, 1984, 1986, according to Maslach, 1993, pp. 20-21). The main reasons are believed to be personal traits and stressful situations in the work environment (personal and organizational factors). Different scales have been used to measure burnout, some of which only measure one dimension – exhaustion (e.g. BM – Burnout Measure), while others cover a broader scope of burnout (see Jocić, 2018, p. 37). Over time, researchers realized that burnout affects not only medical doctors, nurses, physical therapists, paramedics, social workers but also all other employees regardless of where they work.

Even though burnout is related to occupational stress, student activities such as class attendance, sitting for examinations, and completion of various specific assignments can also be considered as a form of work, despite the fact that students are not formally employed by their faculties. In every higher education institution, students are constantly faced with demands that are in fact materialized as stress-inducing situations (Rosales Ricardo and Rosales Paneque, 2013), so the student population finally became a topic of interest among burnout researchers.

Academic burnout is a consequence of and response to chronic stress caused by personal and organizational factors, such as the following: large number of courses and high academic demands (insufficient information given for assignment completion, accompanied by inadequate teacher demands); inadequate workload distribution (duration and number of classes, time required to complete pre-exam duties such as writing term papers or essays, duration of exam terms, exam schedules); access to library holdings; lack of logistical and infrastructural support (underequipped computer rooms, outdated

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equipment, inadequate ventilation, lighting, and even furniture, inadequate public transportation to/from the university/faculty, etc.); lack of financial support for students through scholarships; poor support for the administrative staff; rigid organization; difficulty in participating in and making decisions; and absence of student organizations. Students' stress can also be due to poor relations between them and their teachers (teachers continuously devaluing their capabilities) or between students themselves (lack of socializing or solidarity, conflicts between students), or due to a lack of participation in cultural, recreational, and other extracurricular activities. The list should be expanded by students' self-expectations, as well as expectations from their family, friends, and professors (Osorio, Parrello and Prado, 2020; Baik, Larcombe and Brooker, 2019; Caballero, Bresó and González, 2015; Barradas Alarcón et al., 2017; Rosales Ricardo and Rosales Paneque, 2013; Palacio Sañudo et al., 2012).

Student burnout was usually investigated using two scales – the Maslach Burnout Inventory – Student Survey (MBI-SS) and the School Burnout Inventory (SBI-U 9). Both scales measure burnout in terms of exhaustion, cynicism, and the feeling of inadequacy/inefficiency. Exhaustion is associated with the feeling of exerting oneself to fulfil one's academic duties, and it is manifested in the feeling of fatigue owing to the demands of the teaching process. Academic cynicism refers to the indifference toward one's duties and a sense of detachment from them. Inadequacy refers to the feeling of inefficiency regarding duty fulfilment and the loss of confidence about one's ambitions (Salmela-Aro and Read, 2017; Kutsal and Bilge, 2012; Martínez Martínez and Pinto, 2005). The consequences of student burnout may lead to class absenteeism, reduced motivation to study, dropping out (Yang and Farn, 2005), and even various mental disorders.

Thus far, numerous studies of student burnout have been conducted, which is why only a few of them, which used the abovementioned scales, will be mentioned here. Burnout was usually investigated among students studying to become healthcare workers. For instance, Čarapina and Ševo (2017) and De-Abreu et al. (2011) investigated burnout among medical students, while Bonafé, Maroco and Campos (2014) investigated dentistry students, all using the MBI scale. Yang (2004) used this scale to examine burnout among students of technical sciences, Nikodijević, Anđelković Labrović and Đoković (2012) among students of organizational sciences, and Martínez Martínez and Pinto (2005) among students of different profiles, who were then classified into two groups – humanities and social sciences and experimental and technical sciences. Among others, the SBI scale was used by Osorio, Parrello and Prado (2020), Platania et al. (2020), Osorio et al. (2020), Helve (2019), Salmela-Aro and Read (2017), Robins, Roberts and Sarris (2017), Boada-Grau et al. (2015), Moyano and Riano-Hernandez (2013), and Salmela-Aro and Kunttu (2010) when investigating the academic burnout of students of medical as well as natural, technical, and social sciences and humanities.

Student burnout was the topic of only several Serbian studies. To the present authors' knowledge and according to the literature review, burnout was studied among medical students (Ilić et al., 2017; Backović et al., 2012) and among students of faculties accredited in the field of technical and technological sciences (Nikodijević, Anđelković Labrović and Đoković, 2012; Miltojević, Ilić Krstić and Orlić, 2021), whereby different scales were utilised.

The aim of this research is to determine the degree of academic burnout among the students of basic (undergraduate) academic studies at one of the faculties accredited for the field of technical and technological sciences. The objectives are to examine the extent of burnout and the influence of gender, student tuition fee status, and the year of study on burnout (exhaustion, cynicism, and the feeling of inadequacy).

The set aims and objectives led to the following hypotheses: (H1) Student burnout depends on the degree of exhaustion, cynicism, and the feeling of inadequacy; (H2) There are gender differences in the degree of student burnout; (H3) Student tuition fee status influences the degree of student burnout; (H4) Year of study influences the degree of student burnout.

Materials and Methods

Research instrument: Considering that student burnout has been rather under-investigated in Serbia, this research focuses on three burnout dimensions using the School Burnout Inventory (SBI-U 9). The scale is based on the Bergen Burnout Indicator, which contains 15 items, and the School Burnout Inventory, which contains 10 items measuring the three dimensions of pupil burnout: (a) four items measuring exhaustion at school; (b) three items measuring cynicism toward the significance of school; and (c) three items measuring the feeling of inadequacy at school. However, one of the items concerning the feeling of inadequacy did not refer to personal feelings toward school assignments, so the student burnout scale

now contains 9 items within three subscales: Exhaustion: I feel overburdened by my schoolwork; I often sleep badly because of matters related to my schoolwork; I brood over matters related to my schoolwork a lot during my free time; and The pressure of my schoolwork causes me problems in my close relationships with others; Cynicism: I feel a lack of motivation in my schoolwork and often think of giving up; I feel that I am losing interest in my schoolwork; and I am continuously wondering whether my schoolwork has any meaning; and Feeling of inadequacy: I often have feelings of inadequacy in my schoolwork and I used to have higher expectations of my schoolwork than I do now. The degree of agreement was measured using a 6-point Likert scale ranging from 1 (I completely disagree) to 6 (I completely agree). According to the authors, the scale has a good internal consistency with Cronbach's alpha (α) of 0.88, as do the subscales: exhaustion: $\alpha=0.80$, cynicism: $\alpha=0.80$, feeling of inadequacy: $\alpha=0.67$ (Salmela-Aro at al., 2009). This instrument was used to examine student burnout and thus validate the scale in Finland (Salmela-Aro and Kunttu, 2010), Spain (Moyano and Riano-Hernandez, 2013; Boada-Grau at al., 2015), Peru (Delgadillo, Merino and Caballero, 2013), Columbia (Aguilar-Bustamante and Riano-Hernandez, 2013), Italy (Platania at al., 2020), and Mexico (Osorio at al., 2020).

The present research yielded Cronbach's alpha of 0.82, which indicates good scale reliability and internal consistency. Reliability was also good for the exhaustion subscale, $\alpha= 0.79$, and cynicism, $\alpha =0.84$, while a somewhat lower value was obtained for the feeling of inadequacy – $\alpha= 0.65$.

The results were processed using methods of descriptive statistics (frequency, percentage, mean value, standard deviation and correlation). Chi-square test was used to test hypotheses for $p<0,05$, and analysis of variance (ANOVA) with LSD and Tukey's HSD to determine the significance of differences, whereas eta squared was used to determine the influence between the groups.

Data processing was conducted using SPSS 20.0 software.

Research sample: The sample comprises 194 students, 37.6% of which are male (M) and 62.4% female (F). The highest percentage of the sample (73.8%) has their tuition fee covered in full by the state budget (B), while 26.2% pay for their tuition fee themselves, i.e. they are self-financed (S). The sample includes students from all four years of study: 22% first-year (1st), 26.2% second-year (2nd), 12.6% third-year (3rd), and 39.3% fourth-year students (4th).

The data were collected using a survey conducted via Google in November 2020. The survey was anonymous and sanctioned by the faculty's vice-dean for education.

Results

Regardless of their gender, tuition fee status, and year of study, the highest percentage of the students experienced moderate burnout. Likewise, the highest percentage experienced moderate exhaustion, cynicism, and the feeling of inadequacy (Table 1).

Table 1
Degree of student burnout on the scale and subscales

	Burnout	Exhaustion	Cynicism	Inadequacy
Mild	9.8%	10.8%	19.6%	14.4%
Moderate	58.2%	53.6%	49.5%	49.0%
Severe	32.0%	35.6%	30.9%	36.6%

The results indicate a positive and significant correlation between the burnout dimensions themselves as well as between the dimensions and burnout. Likewise, a correlation was found between tuition fee status, year of study, and burnout, between two burnout dimensions – cynicism and inadequacy, and between gender and exhaustion (Table 2).

Table 2
Correlation matrix

	1	2	3	4
1. Burnout	–			
2. Exhaustion	,519**			
3. Cynicism	,694**	,470**		
4. Inadequacy	,756**	,519**	,694**	–
5. Gender	0.50	,152*	-,011	,050
6. Tuition fee status	,259**	,030	,308**	,259**
7. Year of study	,199**	,121	,210**	,199**

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

According to our data, gender influences only one burnout dimension – exhaustion. A statistically significant relationship was determined between student tuition fee status and academic cynicism and inadequacy. Also, the obtained values indicate that there is a statistical significance between the year of study and academic cynicism (Table 3).

Table 3
Statistical significance of gender, tuition fee status and year of study and burnout

		Burnout	Exhaustion	Cynicism	Inadequacy
Gender	Pearson Chi-Square	2.031	6.092	5.845	0.506
	df	2	2	2	2
	Asim.Sig.	0.362	0.048	0.054	0.777
Tuition fee status	Pearson Chi-Square	6.360	2.571	23.285	14.063
	df	2	2	2	2
	Asim.Sig.	0.042	0.276	0.000	0.001
Year of study	Pearson Chi-Square	12.474	8.498	13.876	10.165
	df	6	6	6	6
	Asim.Sig.	0.052	0.204	0.031	0.118

The obtained eta squared values indicate that gender does not influence student burnout, tuition fee status has only a weak influence, whereas year of study has a moderate influence on academic burnout (Table 4).

Table 4
Influence of gender, tuition fee status, and year of study on burnout

		Mean	Std. Deviation	Eta Squared
Gender	M	2.1644	0.64579	0.005
	F	2.2562	0.58493	
Tuition fee status	B	2.1597	0.59910	0.030
	S	2.4000	0.60609	
Year of study	1 st	2.0476	0.58236	0.060
	2 nd	2.1200	0.62727	
	3 rd	2.1667	0.56466	
	4 th	2.3974	0.58863	

Compared to the male students, twice as many female students experienced severe exhaustion. In addition, a significantly higher percentage of self-financed compared to budget-financed students experienced severe cynicism and feeling of inadequacy. The highest percentage of third-year students experienced severe exhaustion, while the highest percentage of fourth-year students experienced severe cynicism and feeling of inadequacy (Table 5).

Table 5

Gender, tuition fee status, and year of study in relation to student burnout

			Burnout	Exhaustion	Cynicism	Inadequacy
Gender	M	Mild	13.7%	12.3%	24.7%	16.4%
		Moderate	56.2%	63.0%	38.4%	49.3%
		Severe	30.1%	24.7%	37.0%	24.2%
	F	Mild	7.4%	9.9%	16.5%	13.2%
		Moderate	59.5%	47.9%	56.2%	48.8%
		Severe	33.1%	42.1%	27.3%	38.0%
Tuition fee status	B	Mild	11.1%	9.7%	22.9%	17.4%
		Moderate	61.8%	56.9%	55.6%	53.4%
		Severe	27.1%	33.4%	21.5%	29.2%
	S	Mild	6.0%	14.0%	10.0%	6.0%
		Moderate	48.0%	44.0%	32.0%	36.0%
		Severe	46.0%	42.0%	58.0%	58.0%
Year of study	1 st	Mild	14.3%	9.5%	21.4%	21.4%
		Moderate	66.7%	66.7%	64.3%	52.4%
		Severe	19.0%	23.8%	14.3%	26.2%
	2 nd	Mild	14.0%	10.0%	24.0%	22.0%
		Moderate	60.0%	62.0%	50.0%	44.0%
		Severe	26.0%	28.0%	26.0%	34.0%
	3 rd	Mild	8.3%	12.5%	29.2%	8.3%
		Moderate	66.7%	41.7%	37.5%	58.3%
		Severe	25.0%	45.8%	33.3%	33.4%
	4 th	Mild	5.1%	11.5%	12.8%	7.7%
		Moderate	50.0%	44.9%	44.9%	47.4%
		Severe	44.9%	43.6%	42.3%	44.9%

The data indicate that severe burnout is the most pronounced among fourth-year students, with the biggest difference in severe burnout observed between first- and fourth-year students. The data also indicate that severe cynicism increases with years of study (Figure 1).

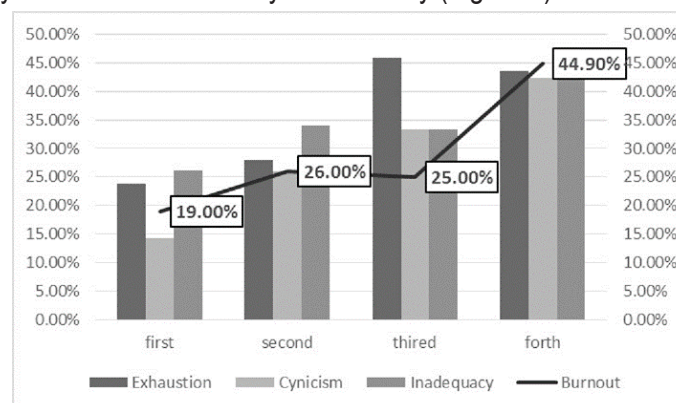


Figure 1. Influence of year of study on severe burnout (exhaustion, cynicism, and the feeling of inadequacy)

Discussions

Student burnout: Regardless of their gender, tuition fee status, and year of study, the highest percentage of the students experienced moderate burnout (Table 1). The obtained data partially correlate with the data obtained by [Osorio, Parrello and Prado \(2020\)](#), the only difference being the results from a single subscale, as they found mild cynicism in their sample, within which 57% of the respondents experienced mild, while 43% experienced moderate and severe cynicism. According to our data, moderate and severe cynicism are prevalent among students (80.4%), whereas mild cynicism was found in less than one-fifth (19.6%) of the respondents. The prevalence of moderate and severe cynicism among Serbian students was confirmed by the data obtained in [Nikodijević, Anđelković Labrović and Đoković \(2012\)](#) and [Miltojević, Ilić-Krstić and Orlić \(2021\)](#). The former study found moderate and severe cynicism among 66.5% of the student respondents, while the latter found them in 56% of the students. Such high percentages accompanied by a detached attitude toward learning, a lack of interest in academic work, and failure to see the purpose of higher education ([Salmela-Aro and Read, 2017](#)) can be explained by social circumstances and the state of the labour market. Completion of one's studies in this transitional period provides no guarantees of finding work within one's profession. A significant number of graduates find employment outside of their profession and often requiring a much lower level of education.

As expected, the results also indicate a positive and significant relationship between the burnout dimensions themselves as well as between the dimensions and burnout (Table 2), which corresponds to the findings by [Salmela-Aro et al. \(2009\)](#).

Gender and burnout: The results from previous studies relating gender and burnout vary. According to some of them, burnout is more pronounced among women ([Purvanova and Muros, 2010](#)), or there is no relationship between gender and burnout ([Breso, Salanova and Schaufeli, 2007](#); [Galan et al., 2011](#)), whereas some studies only found differences between gender and certain burnout dimensions ([Nikodijević et al., 2012](#)).

The results of the present study indicate that gender does not influence burnout (Table 3 and Table 4), but that it is related to a single burnout dimension – exhaustion (Table 2). Exhaustion is more pronounced among the female students, because moderate and severe burnout was found in 90% of the female and 87.7% of the male students. The obtained mean values indicate small differences (M: $M=2.18$, $SD=0.694$; F: $M=1.25$, $SD=0.674$) and the eta squared (0.023) indicates a weak influence of gender on exhaustion. Our data do not correlate with the data obtained in some previous studies. Studies of burnout among students of technical sciences and among students of different scientific fields, which include technical and technological sciences, showed that male students experience a higher degree of burnout compared to female students ([Yang, 2004](#); [Martinez Martinez and Pinto, 2005](#)), but they do correlate with the results obtained by [Miltojević, Ilić Krstić and Orlić \(2021\)](#), [Osorio, Parrello and Prado \(2020\)](#), [Salmela-Aro and Read \(2017\)](#). The explanation for our results may be sought among gender stereotypes that emphasize higher emotional sensitivity of women as well as those that prescribe the roles and duties of women in our culture. In addition to their role as workers, or academic workers in this particular case, women have many other roles, such as housework, care for the younger and elderly household members, and so forth, which leads to their being overburdened because they have to balance different roles and which potentially causes emotional exhaustion.

Tuition fee status and burnout: According to our results, tuition fee status has an influence on burnout (Table 2 and 3). However, the differences of mean values are small and the eta squared of 0.030 indicates a weak influence of tuition fee status on burnout (Table 4).

Differences between budget-financed (B) and self-financed (S) students were found for all three cynicism items. A higher percentage of self-financed students (cumulative percentage of 90%) expressed moderate and high cynicism compared to budget-financed students (cumulative percentage of 77.1%). The obtained mean values (B: $M=1.648$, $SD=0.715$; S: $M=2.000$, $SD=0.816$) indicate differences between these two categories of students, while the eta squared of 0.043 indicates a weak influence of tuition fee status on academic cynicism.

A significantly higher percentage of self-financed students (68%) compared to budget-financed students (43%) partly agree, agree, and completely agree that they feel a lack of motivation in their schoolwork and often think of giving up. A significantly higher percentage of self-financed students (cumulative percentage of 46.2%) state that they are losing interest in their schoolwork compared to budget-financed students (29.7%). In addition, most self-financed students (46.2%) partly agree, agree, and completely agree that they are continuously wondering whether their schoolwork has any meaning compared to budget-financed students (40.5%). The obtained results show that self-financed students foster a more cynical attitude toward their academic duties compared to budget-financed students. Lack

of motivation and interest in one's studies as well as the re-assessment of the purpose of one's studies require further investigation. The causes may be sought in the reasons why students opt for a particular study programme, the tuition fee amount, the financial status of the students and their families, and the labour market conditions upon their graduation.

A statistically significant relationship was determined between the student tuition fee status and the feeling of inadequacy (Table 2 and 3). Ninety-four percent of the self-financed students reported a moderate and strong feeling of inadequacy, which again exceeded the number of budget-financed students (82.7%). The mean values indicate a difference among the two categories (B: $M=1.945$, $SD=0.664$; S: $M=2.307$, $SD=0.630$), while the eta squared of 0.067 indicates that there is a moderate influence of the tuition fee status on the feeling of inadequacy.

A somewhat higher percentage of self-financed students (58.4% compared to 53.5% of budget-financed-students) partly agree, agree, and completely agree that they often have feelings of inadequacy in their schoolwork. Eighty-six percent of self-financed and 58.4% of budget-financed students partly agree, agree, and completely agree that they used to have higher expectations of their schoolwork than they do now. The obtained data about the feeling of inadequacy pertaining to a reduced sense of competence and accomplishment (Salmela-Aro, Tolvanen and Nurmi, 2009) requires further investigation into the structure of the study programmes and the organization of the teaching process.

Year of study and burnout: A correlation has been established between the year of study and cynicism and feeling of inadequacy (Table 3). The differences in mean values (Table 4) and the eta squared of 0.060 indicate a moderate influence of the year of study on burnout. The ANOVA values $F(3, 4.026)$, $p = 0.008$ indicate that the differences are significant, but subsequent tests only showed a difference between the first- and fourth-year students (Sig. 0.002) and between the second- and fourth-year students (Sig. 0.011). In addition, the present findings partially correlate with the findings by Galan et al. (2011) and Salmela-Aro and Read (2017) in that the degree of burnout increases with the years of study, even though a deviation was observed in our sample among third-year students. According to our data, the percentage of students experiencing severe burnout is more than two times higher for fourth-year students compared to first-year students (Figure 1). Cumulative percentages indicate that moderate and severe burnout increases with years of study (1st 85.7%, 2nd 86%, 3rd 91.7%, and 4th 94.9%), which can reflect negatively on occupational burnout after graduating and finding employment. The claim by Robins, Roberts and Sarris (2017) that it is necessary to examine the influence of student burnout on subsequent workplace burnout is thus fully justified.

Although no correlation was found between the year of study and exhaustion, it is relevant to note that some differences were indeed observed between the groups. A high percentage of first-year students (90.5%) exhibit moderate and severe exhaustion, which is in keeping with the findings by Galan et al. (2011) and which can be attributed to the transition from secondary to higher education, different study obligations, a lack of information regarding study programmes (duties and grading), and so forth. On the exhaustion scale, the only statistical significance was found between the year of study and the first exhaustion item (I feel overburdened by my schoolwork). Mean value comparison (1st year: $M=3.98$, $SD=1.024$; 2nd year: $M=3.60$, $SD=1.278$, 3rd year: $M=3.88$, $SD=1.484$, 4th year: $M=4.12$, $SD=1.279$) indicates small differences, while the eta squared (0.027) suggests a weak influence. The ANOVA test was used to examine the influence of the year of study on the feeling of being overburden by schoolwork and a statistically significant difference was found – $F(3, 1.750)$, $p= 0.158$. Subsequent comparisons showed a significant difference only between the mean values of second- and fourth-year students (Sig. 0.025). A significantly higher portion of fourth-year students (78.1%) compared to second-year students (66%) partly agree, agree, and completely agree with this item. Such a high percentage of fourth-year students can be explained by the additional obligations that await them, because in addition to attending classes and fulfilling their pre-exam duties, they also have to perform internships and write their final undergraduate paper.

The majority of students expressed moderate cynicism regardless of their year of study. A high level of cynicism is the most pronounced among fourth year students (Table 5 and Figure 1), which suggests a cynicism trend that grows with the years of study. The ANOVA test was used to examine the influence of the year of study on cynicism. The strength of the influence is apparent from the eta squared of 0.075, which is interpreted as moderate influence. A statistically significant difference was found among the groups – $F(3, 5.138)$, $p=0.002$. Subsequent comparisons showed that there were significant differences (Sig. 0.002 and Sig. 0.029) of the mean values between the first-year ($M=3.21$ $SD=1.159$) and the second-year students ($M=3.46$ $SD=1.474$) compared to the fourth-year students ($M=4.15$ $SD=1.387$), whereas no difference was determined between the mean value for the third-year ($M=3.33$ $SD=1.761$) and all the other students. These data correlate with certain data on the relationship between the year of study and

the degree of cynicism (Galan et al., 2011).

It is important to note that the number of students who partly agree, agree, and completely agree with item the lack of motivation and thoughts of giving up, increases with the year of study (1st year 42.8%, 2nd year 44%, 3rd year 45.8%, 4th year 57.7%). The eta squared of 0.016 indicates a weak influence, while the comparison of mean values did not indicate significant differences between the groups (1st year: $M=3.31$, $SD=1.370$; 2nd year: $M=3.04$, $SD=1.525$; 3rd year: $M=3.33$, $SD=1.736$; 4th year: $M=3.55$, $SD=1.726$). Cumulative percentages (1st year 23.8%, 2nd year 36%, 3rd year 41.7%, 4th year 66.7%) indicate that the number of students who agree and completely agree that they are losing interest in their schoolwork increases with the year of study. The ANOVA test was used to determine the influence of the year of study on loss of interest in schoolwork and a statistically significant difference $F(3, 6.730)$, $p = 0.000$ was established between the groups. Subsequent comparisons showed that there were significant differences of the mean values between the first-year ($M=2.88$, $SD=1.087$) and the second-year students ($M=3.06$, $SD=1.434$) compared to the fourth-year students ($M=3.99$, $SD=1.583$), whereas no significant differences were found between the third-year ($M=3.33$, $SD=1.761$) and the fourth-year students. The eta squared of 0.096 indicates a moderate influence of the year of study on the lack of interest in schoolwork. Cumulative percentages (1st year 21.4%, 2nd year 56%, 3rd year 45.8%, 4th year 70.6%) indicate that the majority of fourth-year students partly agree, agree, and completely agree that they re-evaluate the meaning of their schoolwork. The ANOVA test determined a statistically significant difference $F(3, 9.035)$, $p = 0.000$ between the groups. The mean values (1st year: $M=2.74$, $SD=1.191$; 2nd year: $M=3.30$, $SD=1.515$; 3rd year: $M=3.29$, $SD=1.429$; 4th year: $M=4.09$, $SD=1.508$) and the eta squared of 0.122 indicate a strong influence of the year of study on the third cynicism item. Subsequent comparisons showed that there were significant differences between the first- and fourth-year students (Sig. 0.000) and the second- and fourth-year students (Sig. 0.012). The high level of cynicism observed among the fourth-year students is particularly concerning, as this is the year where they prevalently attend applied professional courses and they are nearing the end of their studies. The reasons can perhaps be found in the factors related to the organization of studies and the current state of society, specifically the difficulties with finding employment in one's profession. The high percentages of students who lose motivation and consider dropping their studies indicate the need for social support from faculty employees and other students (Ekornes, 2021; Čarapina and Ševo, 2017).

The moderate influence of year of study on burnout can be explained by the degree of agreement with the attitudes concerning the feeling of inadequacy, although no statistical significance was found (Table 4). Regardless of the year of study, most students reported a moderate feeling of inadequacy (Table 5). The obtained mean values indicate minimal differences. The ANOVA test was used to examine the influence of the year of study on the feeling of inadequacy. The scope of the influence is apparent from the eta squared of 0.040, which is interpreted as weak influence. A statistically significant difference $F(3, 3.106)$, $p = 0.028$ was determined between the groups. Subsequent comparisons showed that there were significant differences (Sig. 0.045) of the mean values only between the second- ($M=3.66$, $SD=1.349$) and fourth-year students ($M=4.27$, $SD=1.199$), whereas the comparison of the mean values between the first- ($M=3.69$, $SD=1.405$) and third-year students ($M=3.83$, $SD=1.167$) and against the other two groups revealed no significant differences. In contrast with some studies, which showed that the number of students with a strong feeling of inadequacy decreases with the year of study, the present research yielded the opposite results. Namely, 18.7% more fourth-year students have a strong feeling of inadequacy compared to the first-year students.

With the advancement in years of study, the percentage of students who partly agree, agree, and completely agree with item I often have feelings of inadequacy in my schoolwork decreases (1st year 57.1%, 2nd year 56%, 3rd year 54.2%, 4th year 52.6%). The mean value differences are minimal (1st year: $M=3.55$, $SD=1.365$; 2nd year: $M=3.36$, $SD=1.206$; 3rd year: $M=3.50$, $SD=1.383$; 4th year: $M=3.45$, $SD=1.526$), while the eta squared of 0.002 does not indicate an influence of the year of study on inadequacy in schoolwork. A relationship was observed between the year of study and the second inadequacy item I used to have higher expectations of my schoolwork than I do now. Cumulative percentages indicate that the majority of students, from 50% to 81.3%, partly agree, agree, and completely agree that they used to have higher expectations of their schoolwork than they do now (1st year 57.1%, 2nd year 50%, 3rd year 62.5%, 4th year 81.3%). The largest difference was found between the students who completely agree with this item, depending on their year of study. Comparisons of the mean values indicate differences (1st year: $M=3.45$, $SD=1.485$, 2nd year: $M=3.46$, $SD=1.729$; 3rd year: $M=3.79$, $SD=1.414$; 4th year: $M=4.69$, $SD=1.442$), while the eta squared of 0.128 indicates a strong influence of the year of study on the said item. The ANOVA test determined a statistically significant difference $F(3, 8.962)$, $p = 0.000$ between the groups. Subsequent comparisons showed that there were significant differences (Sig. 0.000) between first- and fourth-year

students as well as between second- and fourth-year students, while no significant differences were found after comparing the mean values between first- and third-, second- and third-, and third- and fourth-year students. The data obtained from fourth-year students regarding their reassessment of the meaning of schoolwork and their lack of motivation, as well as those obtained from third- and fourth-year students regarding their loss of interest in schoolwork, are cause for concern. The reasons should be sought in the social circumstances but also in the very organization of studies at the faculty. The inability to find employment in one's profession, the legislation concerning the issuing of licences and certificates, and the cost of studying are certainly some of the social aspects whose change the faculty can only partially influence. However, the risk factors can be sought at the faculty itself, such as the insufficient number of applied professional courses, deficient laboratory equipment, inadequate evaluation of pre-exam duties, overly extensive scope of literature for certain courses, and inadequate grading methods.

Conclusions

The results obtained in this research lead to the conclusion that there is a relation between the degree of exhaustion, cynicism, and the feeling of inadequacy and the degree of burnout among university students, which confirms the first hypothesis. The majority of the surveyed students exhibited moderate burnout. The remaining three hypotheses were not confirmed, but what was confirmed was that there is a relation between gender and exhaustion, specifically that exhaustion is more pronounced among female students, that self-financed students and final-year students exhibit more pronounced cynicism, and that self-financed students exhibit a more pronounced feeling of inadequacy. Since burnout directly affects students' quality of life within and outside the academic environment ([Rosales and Rosales, 2013](#)), further studies of this topic are required to help prevent long-term negative psychosocial consequences for the students as well as potential issues that higher education institutions would face if more students were to drop out.

Limitations: The present research had its share of limitations. Primarily, the sample comprised students of only one faculty dealing with the field of technical and technological sciences, so it is impossible to generalize the results. In addition, only a few variables (gender, tuition fee status, and year of study) were examined against burnout. An objective analysis of burnout causes would require the inclusion of other variables, such as average grade, sources of financial support during studies and financial status of the family, length of studying, permanent place of residence and temporary accommodation during studies, social support system, and a variety of psychological factors. Additionally, the lack of studies investigating burnout among students of technical faculties made the results comparison all the more difficult, as did the insufficient use of the SBI scale in Serbia.

Regardless of the above limitations, this research presumably puts the issue of student burnout into focus, especially of those students enrolled in a study programme accredited in the field of technical and technological sciences, and it broadens the scope of using the SBI-U 9 scale to study student burnout in Serbia.

Limitations notwithstanding, considering the degrees of burnout registered among the surveyed students, it is necessary to acquaint them with personal burnout prevention strategies, for example, how to prioritize, how to set realistic daily and weekly goals, how to approach actual studying and assignment completion, and so forth. Likewise, it is necessary to devise an organizational prevention strategy by analyzing daily and weekly students' engagement in their faculty duties, class materials and pre-exam activity loads, and the schedule of exam periods and the exams themselves. In the course of study programme accreditation, special attention should be given to harmonizing the programme with the needs of the society and the labour market as well as with the legal requirements governing the issuing of licences and certificates. Acquainting the students with personal burnout prevention strategies and devising an organizational strategy will require additional effort from all faculty employees and the formation of a special team to tackle the incidence of burnout, to introduce preventive measures, and to help students overcome this syndrome.

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Conflict of interests

The author declares no conflict of interest.

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